THE JOURNAL OF GAS LIGHTING
WATER SUPPLY & SANITARY IMPROVEMENT

VOL. LIII. No. 1349.] LONDON, MARCH 19, 1889. [41ST YEAR. Price 6d.

WOLSTON'S Paste and Ready Mixed for Use.

Warranted Free from Adulteration. **TORBAY PAINTS.**

FOR GASHOLDERS, &c., &c.

The Original "Torbay Paints"

As supplied during many years to the LONDON GASLIGHT & COKE COMPANY.

TORBAY & DART PAINT Co., Ld.,
23, Gt. George St., Westminster, S.W.
DARTMOUTH, & BRIXHAM (TORBAY).

— ESTABLISHED 1830. —
PARKER & LESTER,
Manufacturers & Contractors.

THE ONLY MAKERS OF
PATENT ANTIMONY PAINT,
Parker's Imperial Black Varnish,
Oxide Paints, Oils, and General Stores for Gas and Water Works.

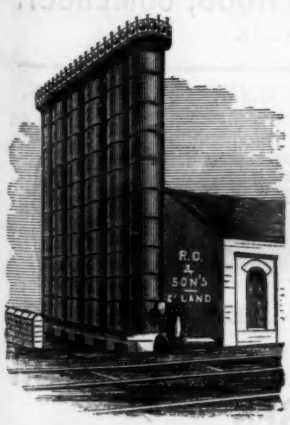
WORKS:
ORMSIDE STREET, OLD KENT ROAD, LONDON.

Ashmore, Benson, Pease, & Co., Ld.,
STOCKTON-ON-TEES
Manufacturing Gas Engineers.
See Advertisement, p. 455.

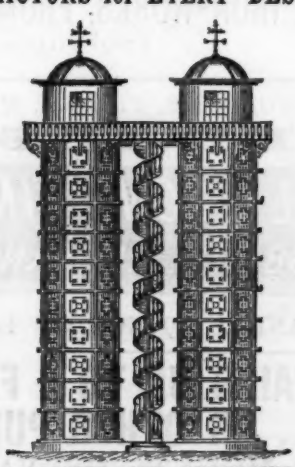
CEMENT
EARLE'S
BEST
PORTLAND CEMENT
MANUFACTURED BY
GEO. & THOS. EARLE,
HULL.
PROMPT DESPATCH:
Seven Jetties on the River.
Two Private Railway Sidings.
FACILITIES FOR DESPATCH:
Six Railway-Waggon Entrances with Steam and Hydraulic Cranes.
Four Rully Entrances.
Three different Railway Companies within easy carriage distance.
Storage Capacity 8000 tons.
Office: 7, PIER STREET.
Works: WILMINGTON.
ESTABLISHED 1811—OVER THREE QUARTERS OF A CENTURY.

"Abyssinian" Tube Wells.
Pure Water Supplies
LE GRAND & SUTCLIFF,
100, BUNHILL ROW,
LONDON.

R. DEMPSTER & SONS, LTD.,
ELLAND, YORKS.,
MANUFACTURERS and CONTRACTORS for EVERY DESCRIPTION of GAS and CHEMICAL PLANT.

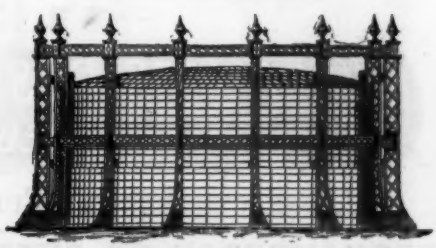


WROUGHT-IRON ANNULAR AND HORIZONTAL CONDENSERS.
Thoroughly effective.
Improved Construction.



SCRUBBERS ANY DIMENSIONS.
OURS continue to give the BEST RESULTS.

ESTIMATES, SPECIFICATIONS, & ILLUSTRATIONS ON APPLICATION.



GASHOLDERS
OF EVERY DESCRIPTION AND SIZE.

Makers of Livesey's Patent Washers for the Colonies and Abroad.

DANIEL HOWARD,

(Successor to the late BENJ. WHITEHOUSE),

GASHOLDER AND BOILER WORKS,

WEST BROMWICH, NEAR BIRMINGHAM (Established 1765),

MANUFACTURER OF

TELESCOPIC AND SINGLE GASHOLDERS,

WROUGHT AND CAST IRON TANKS FOR DITTO,

PURIFIERS, CONDENSERS, SCRUBBERS, HYDRAULIC MAINS, AND ALL KINDS OF GAS APPARATUS,

WROUGHT-IRON ROOFS, BRIDGES, GIRDERS, ETC.,

STEAM, HOT WATER, AND RANGE BOILERS, TANKS, CISTERNS, BOATS,

AND ALL KINDS OF WROUGHT-IRON WORK.

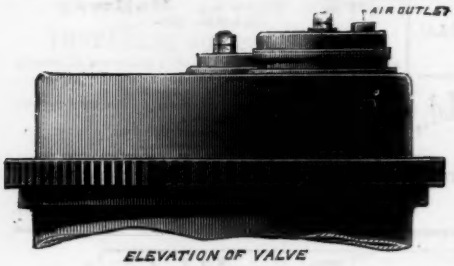
Drawings, Specifications, and Estimates supplied on application.

EDWARD COCKEY & SONS, LTD.,

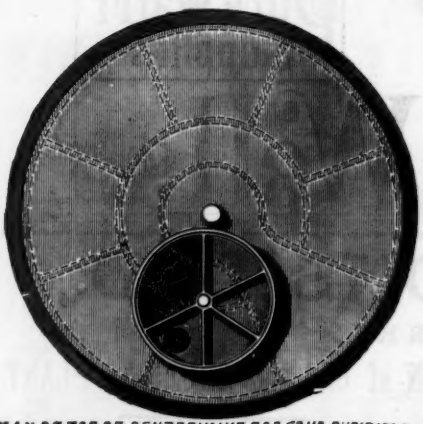
GAS ENGINEERS, IRONFOUNDERS, & CONTRACTORS,

MAKERS OF GASHOLDERS, TANKS, & GAS APPARATUS OF EVERY DESCRIPTION,

SULPHATE & LIQUID AMMONIA PLANTS.



ELEVATION OF VALVE



PLAN OF TOP OF CENTRE VALVE FOR FOUR PURIFIERS

Telegraphic Address: "COCKEYS, FROME."

Wood Grids for Purifiers. Wood Boards for Scrubbers. Cast-Iron Main Pipes and Connections. Station Meters. Governors. Valves of every description. Brass Fittings. Lamp Columns. Boilers. Weighbridges. Coke Breakers. &c., &c.

Patent Washers with improved Overflow Arrangements, requiring no Motive Power, and giving unexcelled results.

PATENT SELF-ACTING BYE-PASS VALVES FOR EXHAUSTING APPARATUS.

Patent Centre-Valves, working all Four Purifiers in a Set, or Three, Two, or One, in Rotation.

PATENT FOUR-WAY BYE-PASS VALVES.

PATENT AIR-CLEARING VALVES FOR WORKING IN CONNECTION WITH CENTRE-VALVES.

The illustration shows one of our new Patent Air-Clearing Valves as fixed on the Cover of a Centre-Valve. When in action, the clean gas from the Outlet Chamber of the Valve is passed down the Outlet-Box of the Purifier last changed, and forced through the Inlet into the Air-Clearing Valve, from which a proper outlet is provided on the top, leaving the Purifier ready charged with clean gas in place of air, as is usual; thus preventing the spoiling or wasting of a large quantity of gas.

Many of these Valves have been fixed, and are giving every satisfaction.

TESTIMONIALS ON APPLICATION.

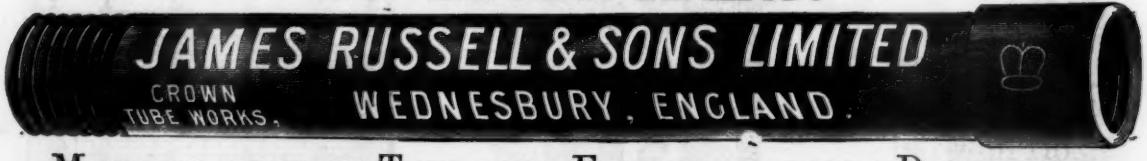
Drawings, Specifications, and Estimates for Apparatus (and the necessary Buildings and Tanks if desired) furnished on application.

THE IRON-WORKS, FROME SELWOOD, SOMERSET.

INQUIRIES INVITED.

HIGHEST AWARDS—LONDON, PARIS, COLOGNE, VIENNA, MELBOURNE, AND OTHERS.

— 11 MEDALS. —



MANUFACTURERS OF TUBES AND FITTINGS OF EVERY DESCRIPTION.

WROUGHT-IRON OR STEEL MAINS UP TO 6 FEET DIAMETER, FOR GAS, WATER, OIL, OR OTHER PURPOSES.

SCREWING TACKLE, BOILER MOUNTINGS, VALVES, COCKS, ETC.

LONDON: 108, Southwark Street.

BIRMINGHAM: 114, Colmore Row.

LEEDS: 6, Mark Lane, New Briggate.

THOMAS PIGGOTT & CO.,

(ESTABLISHED 1822)

SPRING HILL, BIRMINGHAM,

MANUFACTURERS OF

GAS APPARATUS

OF EVERY DESCRIPTION

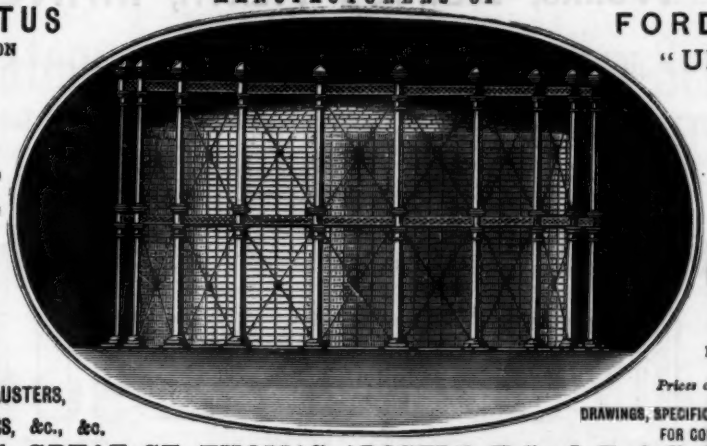
INCLUDING

GASHOLDERS and Tanks, Retorts, Purifiers, Valves, Scrubbers, Condensers,

ETC., ETC.

All of the most approved Designs.

BOILERS, ENGINES, PUMPS, BEALE'S and other EXHAUSTERS, METERS, GAUGES, GOVERNORS, &c., &c.



FORD'S PATENT "UNIVERSAL" SCRUBBER-WASHER.

Numbers at work, giving excellent results.

No Motive Power Required.

ALSO OF

SOMERVILLE'S PATENT

RETORT MOUTHPIECES AND SELF-SEALING LIDS.

NO LUTING REQUIRED.

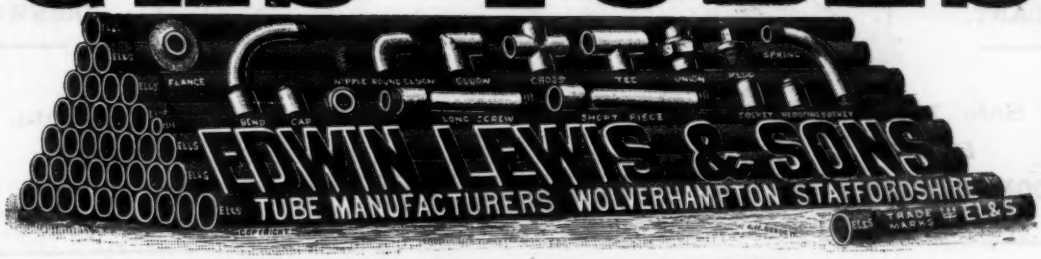
Prices and Particulars on application.

DRAWINGS, SPECIFICATIONS, AND ESTIMATES PREPARED FOR COMPLETE GAS PLANT.

London Offices: 14, GREAT ST. THOMAS APOSTLE, E.C.—J. E. & S. SPENCER, Agents.

ESTABLISHED 1825.

GAS TUBES



MANUFACTURERS OF EVERY DESCRIPTION OF

IRON OR STEEL LAP-WELDED OR BUTT-WELDED TUBES

FOR ANY PURPOSE.

NEWTON, CHAMBERS, & CO., LIMITED,

THORNCLIFFE IRON-WORKS, NEAR SHEFFIELD,

MANUFACTURERS OF

SLIDE VALVES, WITH RACK & PINION, OR Internal or External SCREWS, of all Sizes.

GASHOLDERS, AND Gasholder Tanks.

CAST-IRON RETORTS,

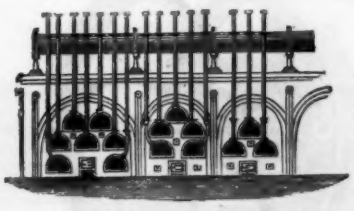
RETORT-BED FITTINGS, AND RETORT-HOUSE APPLIANCES of every description.

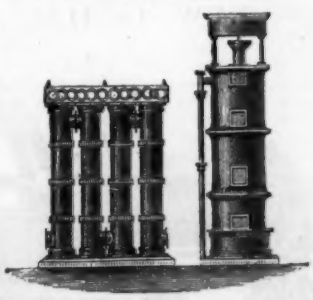
Iron Roofs, Columns, Girders, Floor Plates and Tools, &c.

WROUGHT AND CAST IRON CONDENSERS, SCRUBBERS, & WASHERS

TAR AND LIQUOR PUMPS, &c.

PATENT CENTRE VALVES for working Purifiers. Also Bye-Pass & Stop Valves.



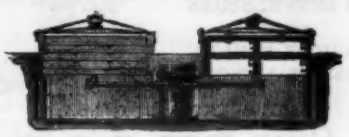


PURIFIERS with Planed Joints.

HAND and HYDRAULIC LIFTING GEAR, CAST-IRON MAINS and SPECIALS.

WOOD GRIDS.

CAST AND WROUGHT IRON TANKS AND CISTERNS.



DESIGNS, SPECIFICATIONS, AND ESTIMATES FREE.

Pig Iron (*Special Quality*) for ENGINE CYLINDERS, &c.

GAS COAL FAMOUS FOR ITS UNRIVALLED EXCELLENCE.

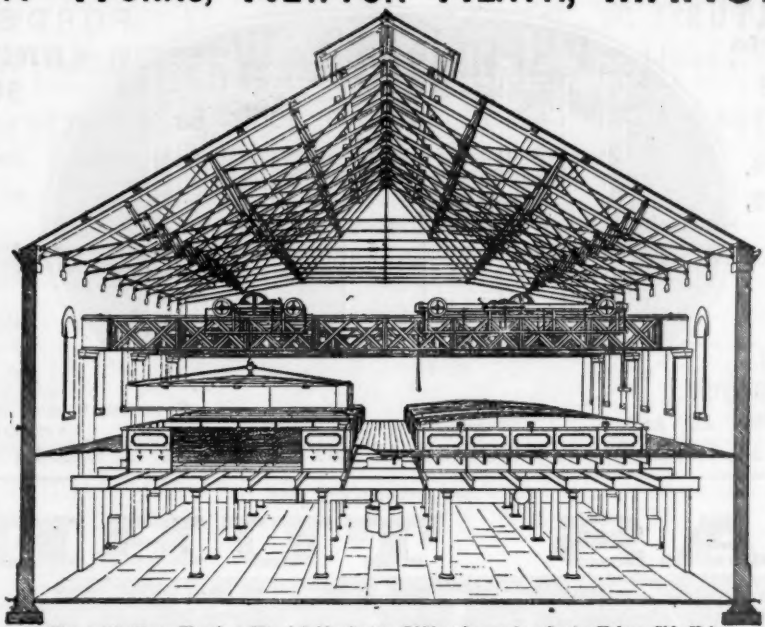
R. & J. DEMPSTER,

Engineers, Ironfounders, & Contractors,

GAS PLANT WORKS, NEWTON HEATH, MANCHESTER.

WROUGHT-IRON
Roofs,
Girders,
Bridges,
Retort-Lids,
Ascensions,
Hydraulics,
Foul Mains,
Condensers,
Boilers,
Gasholders,
Tanks,
Stills,
Services.

CHEMICAL PLANT.



CAST-IRON
Columns,
Beams,
Floor Plates,
Retorts,
Fittings,
Brackets,
Washers,
Scrubbers,
Purifiers,
Valves,
Tanks,
Mains,
Lamp-posts.

STRUCTURAL IRONWORK.

Purifiers with Stage Flooring, Wood Grids, Covers, Lifting Apparatus, Centre-Valves, Side-Valves, Connections, and Roofs of every variety and for any size of Gas-Works.

Sole Makers of Livesey's Patent Washer north of Birmingham.

ESTIMATES, WITH SPECIFICATIONS AND ILLUSTRATIONS, FURNISHED UPON APPLICATION.

LONDON OFFICES: 181 and 182, GRESHAM HOUSE, OLD BROAD STREET, E.C.

Telegraphic Addresses: "SCRUBBER MANCHESTER" and "SCRUBBER LONDON."

HARRIS & PEARSON,

STOURBRIDGE, ENGLAND.

MANUFACTURERS OF

FIRE-CLAY GAS-RETORTS, FIRE-BRICKS, LUMPS, & TILES of Every Description

GLAZED BRICKS AND PORCELAIN BATHS.

CROSSLEY'S "OTTO" GAS-ENGINE.

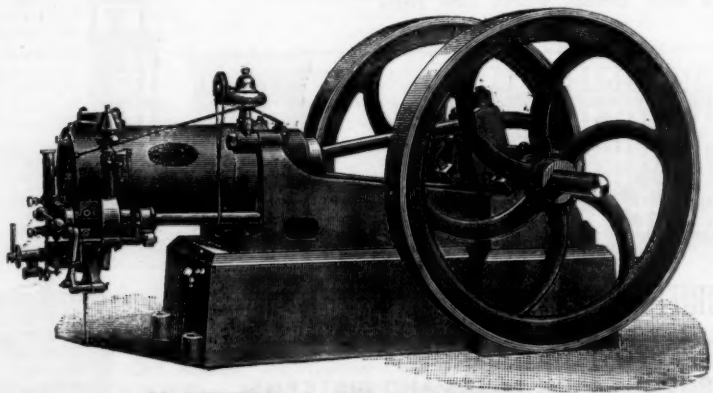
MADE in SIZES
2 Man to 100 HP.

GAS-ENGINES
COMBINED
WITH
PUMPS
FOR
TOWNS SUPPLY,
SEWAGE, &c., &c

GAS-ENGINES
COMBINED
WITH
AIR COMPRESSORS
FOR THE
SCHONE SEWAGE
SYSTEM, LUCIGEN
LIGHT, &c.

70 Prize Medals.

NEW 14 H.P. NOMINAL SIZE.



MADE in SIZES
2 Man to 100 HP.

VERTICAL
AND
HORIZONTAL
TYPES.

ENGINES
COMBINED
WITH
HOISTS, PUMPS,
DYNAMOS, &c., &c.

Largely used for
EXHAUSTING,
PUMPING,
COKE CRUSHING,
ELECTRIC LIGHTING,
&c., &c.

Over 27,000 "OTTO" ENGINES have now been made.

CROSSLEY BROS., LTD., OPENSHAW, MANCHESTER,

LONDON,
LIVERPOOL,
GLASGOW,
NEWCASTLE.

KIRKHAM, HULETT, & CHANDLER, LIMITED.

(Mr. SIDNEY HERSEY, Managing Director.—Address at foot.)

351 Patent "Standard" Washer-Scrubbers,

Equal to a Daily Capacity of 306,600,000 Cubic Feet of Gas,

Erected and in course of construction at present date, amongst them being the following, viz.:—

	Capacity. Cubic feet per day.
Altrincham	600,000
Adelaide	600,000
Aldershot	200,000
Allegheny, U.S.A.	1,000,000
Ashton-under-Lyne	1,250,000
Amsterdam	1,500,000
"	1,500,000
Annaberg	200,000
Arcachon	100,000
Animal Charcoal Co..	200,000
Altoona, U S.A.	350,000
Buxton	250,000
Bradford	1,000,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,000,000
"	1,000,000
"	3,000,000
Bremen	150,000
Baltimore, U.S.A.	1,000,000
"	1,000,000
"	1,000,000
Balmain, N.S.W.	125,000
Bishops Stortford	150,000
Blackpool	400,000
Brussels	1,250,000
"	1,250,000
"	750,000
"	1,250,000
Banbury	250,000
Birmingham	5,000,000
Birkenhead	2,500,000
Blackburn	1,500,000
Bochum	600,000
Burntisland	250,000
Boston, U.S.A.	2,000 000
Brisbane	1,500,000
"	300,000
Burton-on-Trent	1,500,000
Barcelona	350,000
Barking	100,000
Baerlien & Co.	20,000
"	420,000
Bombay	700,000
Buffalo, U.S.A.	550,000
"	500,000
Brooklim, U.S.A.	300,000
Bergen	250,000
Berlin	150,000
Bournemouth	1,000,000
Bridgeport, U.S.A.	500,000
Brunswick	300,000
Beck & Co., St. Louis	100,000
Barmen Rittershausen	600,000
Bexhill	125,000
Brooklyn, U.S.A.	1,000,000
"	1,000,000
Brunner, Mond, & Co.	400,000
Cheltenham	2,000,000
Cannes	200,000
Croydon	1,500,000
Copenhagen	200,000
Clevedon	200,000
Columbus, U.S.A.	500,000
Cincinnati, U.S.A.	1,500,000
"	1,500,000
Chicago, U.S.A.	3,000,000
"	1,000,000
"	1,000,000
Chemnitz	1,000,000
Crewe	1,250,000
Colonial Gas-Works Co.	100,000
Cadiz	300,000
Charottenberg	600,000
Dudley	750,000
Driffield	100,000
Dukinfield	500,000
Dover	750,000
"	1,000,000
Deal	200,000
Derby	1,500,000

	Capacity. Cubic feet per day.
Dublin	3,000,000
Dowlais	100,000
Douai	500,000
Denton	500,000
Derby, U.S.A.	350,000
Denver, "	500,000
" "	1,000,000
Düsselldorf	750,000
"	500,000
Dumfries	250,000
Dunedin, N.Z.	400,000
Darlington	1,250,000
Detroit, U.S.A.	750,000
Edinburgh	1,500,000
"	2,000,000
Enfield	300,000
Essen	300,000
Elbing	150,000
Falmouth	150,000
Frankfort	300,000
Farnworth	400,000
Fenton	400,000
Friedenshütte	500,000
Fürth	400,000
Freiburg	200,000
Goole	250,000
Glossop	300,000
Guildford	300,000
Gloucester	1,250,000
Gera	300,000
Grafton, N.S.W.	100,000
Grieg	300,000
Georgetown, U.S.A.	250,000
Gluckauf	200,000
Heywood	600,000
Holywood	125,000
Huy	70,000
Harrow	250,000
Harrogate	250,000
Halstead	150,000
Heilbronn	200.000
Havanna, Cuba	750 000
Hastings	1 500,000
Huddersfield	300,000
"	750,000
"	1,500,000
Hof	200,000
Hampton Wick	500,000
Heckmondwike	500,000
Haverfordwest	100,000
Halifax, N.S.	350,000
Hamm	200,000
Halle	400,000
Heidelberg	300,000
Hartford, U.S.A.	1,000,000
Ilkeston	300,000
Inverness	250,000
Ilkley	200,000
Ilford	100.000
Kingston-on-Hull	400,000
Kidderminster	750,000
Kidsgrove	100,000
Königsberg	1,000,000
King's Lynn	300,000

LONDON:—

The Gaslight and Coke Co.:—	
Beckton	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	1,250,000
"	2,500,000
"	2,500,000
Silvertown	1,000,000
Bromley	2,000,000
"	1,500,000
"	1,500,000
"	1,500,000
"	2,000,000
"	1,500,000

LONDON—*Continued.*	Capacity. Cubic feet per day.
Shoreditch	2,500,000
Pancras	1,500,000
"	1,500,000
Pimlico	2,000,000
Nine Elms	3,000,000
"	3,000,000
South Metropolitan Co.:—	
Greenwich	3,000,000
Woolwich	400,000
Vauxhall	3,000,000
"	3,000,000
Lea Bridge	300,000
West Ham	1,500,000
Leeds	2,000,000
"	3,000,000
"	3,000,000
"	3,000,000
"	3,000,000
"	2,000,000
Leominster	150,000
Leiden	560,000
"	600,000
Liverpool	2,000,000
"	2,000,000
"	2,000,000
"	2,000,000
"	2,000,000
"	3,000,000
Lincoln	1,000,000
"	600,000
Lowell, U.S.A.	1,000,000
Laclede, "	1,000,000
Louisville "	1,500,000
Long Eaton	500,000
Lille	900,000
"	450,000
"	750,000
"	250,000
"	250,000
Luckenwalde	330,000
Liegwitz	300,000
Lincoln, U.S.A.	250,000
Lawrence "	500,000
Lynn "	300,000
Lyons	1,500,000
Maidstone	1,000,000
Marseilles	1,500,000
"	1,500,000
Mons	500,000
Malines	250,000
Melbourne	1,500,000
"	1,500,000
"	1,500,000
"	1,500,000
"	1,500,000
Manchester	2,500,000
Middleton	400,000
Manley, N.S.W.	100,000
Minneapolis, U.S.A.	750,000
Magdeburg	300,000
Memphis, U.S.A.	750,000
Nottingham	1,250,000
"	2,500,000
"	2,500,000
"	2,000,000
"	1,500,000
"	2,000,000
Newport, U.S.A.	430,000
Newmarket	150,000
Newark, U.S.A.	680,000
Northfleet	200,000
New York, U.S.A.	2,000,000
Nice	600,000
Newcastle, N.S.W.	200,000
Numea, "	100,000
Namur	250,000
Newark	350,000
Nassau, U.S.A.	1,000,000
Oldbury	500,000
Otley	200,000
Oswestry	250,000

	Capacity. Cubic feet per day.
Ober Schlesian	1,500,000
Otto & Co.'s Coke Works	1,500,000
Plymouth	2,000,000
Parramatta, N.S.W.	100,000
Prescot	150,000
Providence, U.S.A.	750,000
"	750,000
Plauen	300,000
"	300,000
Portsmouth	2,500,000
"	2,500,000
Pittsburgh, U.S.A.	1,500,000
Portland "	560,000
Pawtucket "	500,000
Quebec	250,000
Radcliffe	750,000
Rouen	250,000
Ramsgate	1,000,000
Reigate	200,000
Richmond, U.S.A.	250,000
Roxbury, "	500,000
Runcorn Soap Co.	20,000
Rockhampton, N.S.W.	125,000
Richmond	1,500,000
Reading	2,000,000
Reichenbach	200,000
Salford	1,750,000
"	1,750,000
"	1,750,000
Smethwick	750,000
Sydney, N.S.W	1,000,000
"	1,000,000
"	2,500,000
"	50,000
"	50,000
Sunderland	1,500,000
St. Joseph's, U.S.A.	250,000
Spa	100,000
Sevenoaks	300,000
St. Petersburg	2,000,000
"	1,500,000
St. Louis, U.S.A.	2,000,000
"	2,000,000
"	1,000,000
Silesian Coal Co.	600,000
San Francisco, U.S.A.	2,000,000
"	2,000,000
Sheepbridge Coal Co.	40,000
Stettin	200,000
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Tottenham	1,000,000
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Wormwood Scrubbs	300,000
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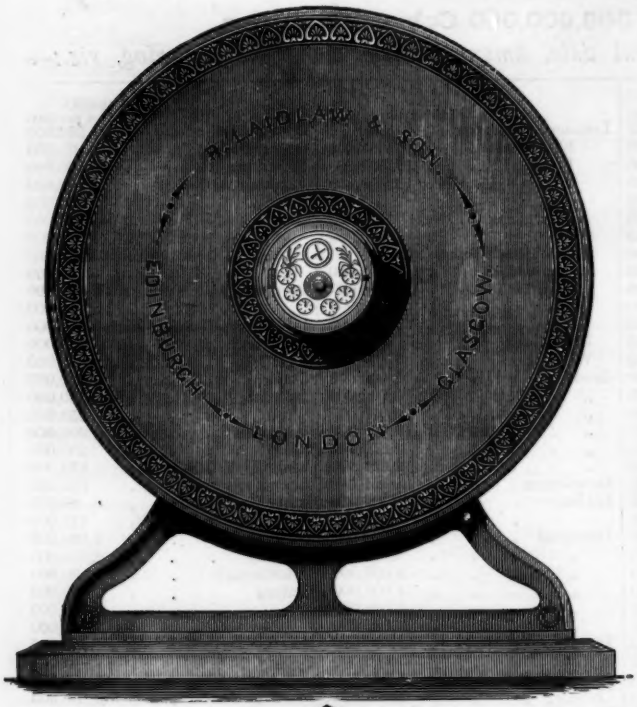
IN ROUND OR SQUARE CASES, ALL SIZES.



Makers in EDINBURGH of

WET AND DRY GAS-METERS,
IMPROVED STATION GOVERNORS,
PRESSURE REGISTERS,
(To Indicate New Time),
PRESSURE GAUGES, TEST HOLDERS,
EXPERIMENTAL HOURLY-RATE METERS,
EXPERIMENTAL TEST-METERS,
CONDENSER THERMOMETERS,
SIEMENS' WATER-METERS,
STREET LANTERNS,
AND ALL KINDS OF
GAS APPARATUS AND FITTINGS, &c.

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LAMP PILLARS,
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DOUBLE-FACED SLUICE VALVES,
INTERNAL and **EXTERNAL RACK** or **SCREW SLIDE VALVES,**
CAST-IRON COLUMNS,
BEAMS, GIRDERS, and **WATER TANKS.**
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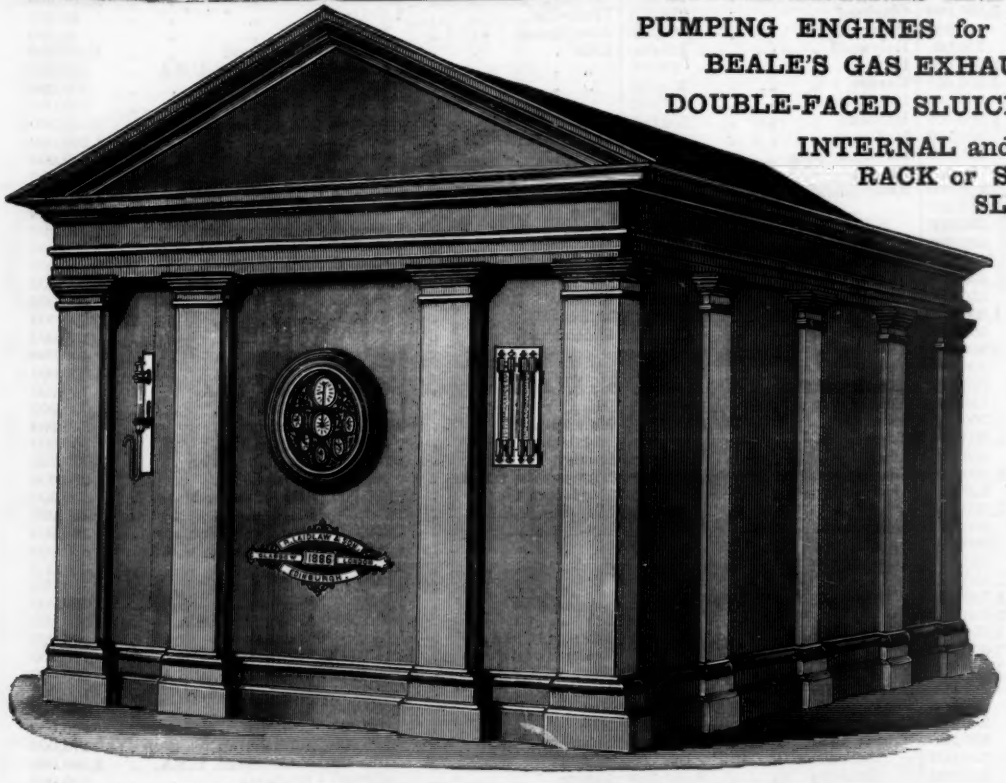

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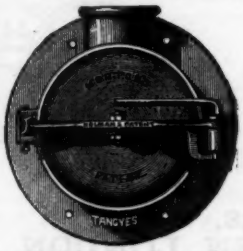
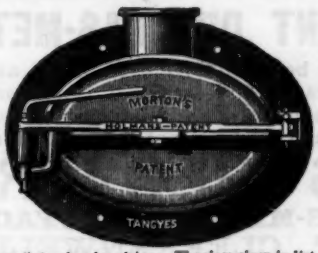
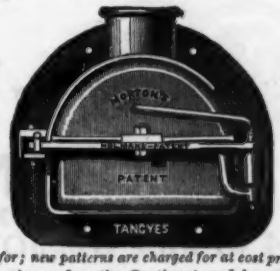
Sole Makers of **MORTON'S** Patent Self-Sealing **RETORT-LIDS,**

With Anti-Friction CATCHES, and Self-Sustaining CROSS-BARS.







Price of Mouthpieces depends on number required, which please state when inquiring. The sizes given in list we have patterns for; new patterns are charged for at cost price.

These Patent Retort Lids and Fastenings are in extensive use in most of the Gas-Works in Great Britain, America, and on the Continent, and have almost entirely displaced the older method of sealing by a luting of lime or other material. The Lids are made in three forms, D, oval, and round (as shown above), in each of which we have a very extensive variety of patterns, from which Gas Engineers contemplating the adoption of these lids are recommended to make their selection, in order to avoid cost of pattern making, delays, &c., &c.

Mouthpieces with Circular Lids for Oval Retorts.

Pattern No.	Diam. Mouth.	Internal Dimensions of Retort.	Length of Mouthpiece.	PRICE, Lid and Fittings without Mouthpiece.
13858	14 ins.	14 × 12 ins.	15 ins.	£0 19 0
4356	14 „	18½ „ 13 „	12½ „	0 19 0
6851	15 „	16 „ 14 „	13 „	1 0 0
3629	15 „	18½ „ 13½ „	14 „	1 0 0
3580	15 „	21 „ 15 „	15 „	1 0 0
6264	16 „	18½ „ 15½ „	15½ „	1 1 0
5210	16 „	20 „ 14 „	15 „	1 1 0
6263	16 „	24 „ 16 „	15½ „	1 1 0
5370	17 „	20 „ 14 „	14 „	1 3 0
6832	17 „	20 „ 14 „	17 „	1 3 0
6183	17 „	20 „ 15 „	15 „	1 3 0
4289	17 „	21 „ 15 „	14 „	1 3 0
5270	17 „	22 „ 14 „	14 „	1 3 0
3631	18 „	18 „ 14 „	20 „	1 5 0
3661	18 „	21 „ 14 „	18½ or 15 „	1 5 0
3554	18 „	21 „ 15 „	14½ „	1 5 0
7957	18 „	22 „ 16 „	14 „	1 5 0
8048*	19 „	25½ „ 15 „	18 „	1 8 6

Mouthpieces with Oval Lids for Oval Retorts.

Pattern No.	Dimensions of Mouth.	Internal Dimensions of Retort.	Length of Mouthpiece.	PRICE, Lid and Fittings without Mouthpiece.
9800	18 × 14½ ins.	18 × 14½ ins.	15 ins.	£1 5 0
9205	20 „ 12 „	24 „ 14 „	10½ „	1 10 0
10000	20½ „ 14½ „	20½ „ 14½ „	15 „	1 10 0
9690	21 „ 15 „	21 „ 15 „	15 „	1 12 0
10056	21 „ 14½ „	21 „ 14½ „	16½ „	1 12 0
13218	21 „ 15 „	21 „ 15 „	17 „	1 12 0
10514	22½ „ 13½ „	22½ „ 13½ „	18½ „	1 13 0
13766	20 „ 17 „	20 „ 17 „	15½ „	1 15 0
13269	24 „ 15 „	24 „ 15 „	16 „	1 18 0

190

Mouthpieces for Round Retorts.

Diam. .. .. ins.	14	15	16	17	18
Price, Lid and Fittings without Mouthpiece } £	0 19 0	1 0 0	1 1 0	1 3 0	1 5 0

Mouthpieces with Circular Lids for D Retorts.

Pattern No.	Diam. Mouth.	Internal Dimensions of Retort.	Length of Mouthpiece.	PRICE, Lid and Fittings without Mouthpiece.
5348	14 ins.	14 × 13 ins.	7 ins.	£0 19 0
3463	15 „	15 „ 13 „	14 „	1 0 0
6678	15 „	15 „ 14 „	12 „	1 0 0
3661	15½ „	15½ „ 13 „	12 „	1 1 0
13052	16 „	16 „ 13 „	18 „	1 1 0
5801	16 „	16 „ 14 „	15 „	1 1 0
6827	16 „	16 „ 14 „	17 „	1 1 0
4494	16 „	16 „ 14 „	14 „	1 1 0
3548	16 „	16 „ 15 „	12½ „	1 1 0
6677	16 „	16½ „ 13½ „	12½ „	1 1 0
9645	16 „	16½ „ 13½ „	12½ „	1 1 0
4434	16 „	17½ „ 14 „	14 „	1 1 0
6469	16 „	18 „ 14 „	15 „	1 1 0
9015	16 „	18 „ 14 „	18½ „	1 1 0
4327	16 „	18 „ 15 „	15½ „	1 1 0
8049*	16 „	18 „ 15 „	17½ „	1 1 0
6137	16 „	20½ „ 13½ „	13½ „	1 1 0
5918	17 „	18 „ 14 „	14 or 17 „	1 3 0
5053	17 „	19½ „ 13 „	14½ „	1 3 0
7548	17 „	20 „ 13 „	15 „	1 3 0
6468	17 „	20 „ 16 „	15½ „	1 3 0
4316B	17 „	21 „ 14 „	14 „	1 3 0
7975	17 „	21 „ 15 „	14½ „	1 3 0
13459	17 „	21½ „ 13½ „	15 „	1 3 0
12990	18 „	18 „ 15 „	15 or 19 „	1 5 0
7135	18 „	18½ „ 15 „	13 „	1 5 0
10221	18 „	18 „ 16 „	13½ „	1 5 0
4506	18 „	20 „ 13 „	19½ „	1 5 0
6470	18 „	20 „ 13 „	15 „	1 5 0
6818	18 „	20 „ 13½ „	17½ „	1 5 0
4083	18 „	20 „ 15 „	16 „	1 5 0
5306	18 „	20½ „ 14 „	13½ „	1 5 0
13295	18 „	20½ „ 14 „	19½ „	1 5 0
7356	18 „	20½ „ 13½ „	13 „	1 5 0
4569	18 „	21 „ 14 „	18 „	1 5 0
3628	18 „	21 „ 15 „	16 „	1 5 0
7640	18 „	22 „ 13½ „	13½ „	1 5 0
7971*	20 „	20 „ 15 „	18 „	1 11 0

*Patterns marked * have Sockets at back to connect to Retorts; all the others are flanged. Patterns marked* B *have curved bottoms.* 191

Mouthpieces with D Lids for D Retorts.

Pattern No.	Dimensions of Mouth.	Internal Dimension of Retort.	Length of Mouthpiece.	PRICE, Lid and Fittings without Mouthpiece.
12292	15½ × 13 ins.	15½ × 13 ins.	12 ins.	£1 2 0
9967	16 „ 14 „	16 „ 14 „	15½ „	1 3 0
13574	16½ „ 13½ „	16½ „ 13½ „	19½ „	1 4 0
9899	18 „ 12 „	18 „ 12 „	14 „	1 4 0
12980	16 „ 16 „	16 „ 16 „	18 „	1 6 0
13000	18 „ 13½ „	18 „ 13 „	15 „	1 6 0
9912	18 „ 13½ „	18 „ 13½ „	17 „	1 6 0
9962	18 „ 13½ „	18 „ 15½ „	16 „	1 6 0
10982	18 „ 13½ „	18 „ 14 „	15 „	1 6 0
11098	18 „ 14 „	18 „ 14 „	12 „	1 6 0
9492	20 „ 13 „	20 „ 13 „	15 „	1 10 0
9208	20 „ 13 „	20 „ 13 „	19½ „	1 10 0
10251	20 „ 13 „	20 „ 13 „	15½ „	1 10 0
12964	20 „ 13 „	20 „ 13 „	13½ „	1 10 0
9909	20 „ 13½ „	20 „ 13½ „	17 „	1 10 0
12969	19½ „ 15½ „	19½ „ 15½ „	14 „	1 11 0
13781	20 „ 15 „ Front. / 21 „ 15 „ Back.	21 „ 15 „	15 „	1 11 0
7692	21 „ 15½ „	21 „ 15½ „	16 „	1 11 0
12978	20 „ 16 „	20 „ 16 „	17 „	1 11 0
13252	20 „ 16 „	20 „ 16 „	18 „	1 11 0
13220	21 „ 15 „	21 „ 15 „	17 „	1 11 0
8977	21½ „ 13½ „	21½ „ 13½ „	18½ „	1 11 0
8976	21½ „ 13½ „	21½ „ 13½ „	16½ „	1 12 0
10497	21½ „ 13½ „	21 „ 13½ „	18½ „	1 12 0
8037	21½ „ 13½ „	21½ „ 13½ „	18½ „	1 12 0
9908	21½ „ 13½ „	21½ „ 13½ „	15 „	1 12 0
10404	21½ „ 13½ „	22 „ 14 „	18½ „	1 12 0
12410	21½ „ 13½ „	22 „ 14 „	12 „	1 12 0
13822	21½ „ 13½ „	22 „ 14 „	15 „	1 12 0
10515	22½ „ 12½ „	22½ „ 12½ „	13½ „	1 12 0
7924	24 „ 14 „	24 „ 14 „	15½ „	1 13 0
13807	24 „ 15½ „	24 „ 15½ „	16 „	1 14 0
9015B	25 „ 14 „	25 „ 14 „	13½ „	1 14 0
10932	25 „ 14 „	24 „ 14 „	18½ „	1 15 0
12944B	22 „ 16 „	22 „ 16 „	16 „	1 15 0

Patterns marked B *have curved bottoms.* 192

HUNT'S PATENT EQUILIBRIUM DIRECT MAIN

GAS GOVERNOR.

In this Governor a throttle valve is substituted for the ordinary suspended cone; all external communication being avoided by placing the lever or radius arm inside the valve chamber upon the disc.

The disc is carried upon steel centres, upon which it is accurately balanced.

4 ins. ..	£17 0	8 ins. ..	£25 0	14 ins. ..	£42 0	20 ins. ..	£60 0
5 „ ..	20 0	10 „ ..	33 0	16 „ ..	46 0	24 „ ..	72 0
6 „ ..	22 10	12 „ ..	38 0	18 „ ..	50 0	36 „ ..	130 0

195

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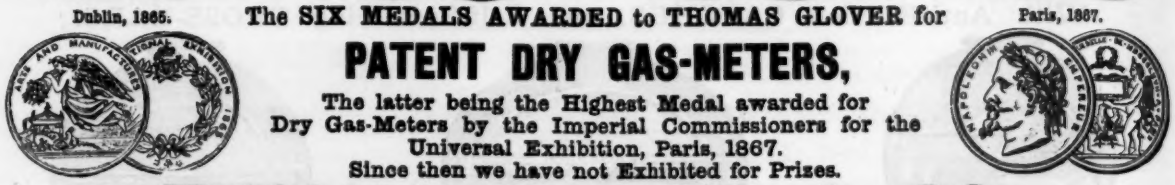
Established 1844.] **ORIGINAL MAKERS.** [Established 1844.

London, 1851. New York, 1853. Paris 1855. London, 1862.

Dublin, 1865. Paris, 1867.



The SIX MEDALS AWARDED to THOMAS GLOVER for

PATENT DRY GAS-METERS,

The latter being the Highest Medal awarded for Dry Gas-Meters by the Imperial Commissioners for the Universal Exhibition, Paris, 1867.
Since then we have not Exhibited for Prizes.

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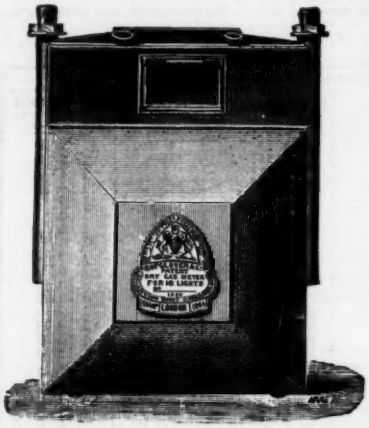

1st—Are a remedy for all the defects of Wet Meters.
2nd—Are suitable for all climates, whether hot or cold.
3rd—Incur no loss of Gas by Evaporation.
4th—Cannot become fixed by frost, however severe.
5th—Are the most accurate & unvarying measurers of Gas.
6th—Prevent jumping or unexpected extinction of the Lights.
7th—May be fixed either above or below the level of the Lights.
8th—Cannot be tampered with without visibly damaging the outer case.
9th—Will last much longer than Wet Meters.
10th—Will not cost more than one-half for repair that Wet or Water Meters do.
Are upheld for five years without charge.

Meters fitted with Grey's Index or Harding's Counter.

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COTTAGE LANE WORKS, CITY ROAD, LONDON.

NEW DESIGN STATION METER (No. 2 PATTERN).

W. PARKINSON & CO. have introduced the above design of Station Meter in order to meet the demand for a more ornamental Tank. It is simpler in construction than No. 1 Pattern, and consequently less in cost. All joints are planed, the most modern improvements introduced, and the entire Meter is of the strongest and most substantial description.

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PARKINSON'S PATENT THREE-PARTITION MEASURING DRUM.

MATERIALS and WORKMANSHIP of the VERY BEST QUALITY ONLY. PRICES, &c., ON APPLICATION

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THE JOURNAL OF GAS LIGHTING,

WATER SUPPLY, & SANITARY IMPROVEMENT.

TUESDAY, MARCH 19, 1889.

GAS AT THE FRENCH EXHIBITION.

To be accustomed to take our pleasures sadly is an imputation which we Britons accept without much protest, goodnaturedly overlooking the unreliability for the sake of the smartness of the epigram. We might reply to the neighbouring nation that is conventionally supposed to be so much livelier than ourselves, to one of whose brilliant sons of the olden time the foregoing apothegm is credited, that if we are inclined to be sad, the French of this modern age are even more distinctly prone to be serious in their diversions. Frenchmen make a much more important business of their amusements than we do. We are prepared to admit in a general way, for example, that the stage and the concert-room, which the majority of English people patronize primarily for the sake of diversion from the actualities of existence, have a sufficiently serious aspect for those who make their livelihood out of music and the drama. We do not regard the theatre as a suitable object of national solicitude, however, like the French, to whom the Paris Opera is as important as any public department. Amusements, and even what we should call dissipations, are subjects of Government administration across the Channel; and it is with the full assent of public opinion that Government Departments and Local Authorities apply to the organization of fêtes the proceeds of rates and taxes which in England would be spent upon drains and water supply. Similarly, when one approaches the border-land between work and play which is occupied by industrial exhibitions, one finds a marked difference between the French and English points of view of such enterprises. We certainly spend a vast deal of money upon the ornamental and pleasure part of our industrial exhibitions. But we do so in an apologetic way; and, in speaking of them, make as little as possible of this side of such undertakings. Not so the French. They frankly recognize, as in the case of their own forthcoming Exhibition, that a calculated extravagance in the provision of mere amusement, in decorations and appointments without pretension to utility, and in downright "sensationalism," may be the height of mercenary prudence. Their Exhibition is a great national manifestation of wealth and energy. It is political, racial, social, industrial, as well as national. And it is meant, above all things, to be an advertisement of what France can show by way of justifying her existence among the nations, As a consequence, the French are terribly in earnest about it. They may have their troubles in matters of government; but no squabbles between the "ins" and the "outs" are to be permitted to jeopardize the prospects of the great pleasure fair and trades' bazaar. Revolution may be in the air; but it will be bottled up and wired down for a few months at least, for fear lest the pilgrims from afar, with the heavy money-bags, should be scared away from the Champ de Mars by the smell of gunpowder. For the great Exhibition is a money-making speculation after all. Underlying the proposed glorification of the immortal principles of Liberty, Equality, and Fraternity is the intention to make the foreigner pay for the show. That stupendous maypole, the Eiffel Tower, is set up with a lavish and apparently reckless desire to draw the crowd at any cost; but this piece of fantasy is to be regarded as part of a cleverly-devised money-trap. People will be welcome to laugh at the preposterous tower if they feel so inclined, provided only they go to see it and pay the gate-money.

In this supreme effort for the glorification of French art and industry, the French *gaziers* are not likely to be wanting. They have made up their minds to play their part worthily; and the first proof of the quality of their enterprise in this regard will have been seen in the illustration and description which we published last week of the "Gas "House," the erection and equipment of which in the Exhibition grounds have been undertaken by a Commission of the French Association of Gas Managers, with MM. Ellissen and Cornuault at the head. It is unnecessary to detail here all that is to be done in connection with this special advertisement of the French gas industry during the time the Exhibition is open. The very title of the structure shows clearly enough what it is meant to be; and the names of the Engineers who have the work in hand should be a sufficient guarantee of the manner in which the objects of the enterprise will be carried out. We hope at least that they will not be troubled inordinately by the trade rivalries and animosities which experience shows may be evoked and exasperated by such work as they are doing. It is possible, and according to precedent, that the manufacturer who is appointed to fit up the back passage may thenceforth cherish undying hatred of him to whom may be entrusted the lighting of the front hall; and that the already abundant periodical gas literature of France may be swelled by the addition of another publication subsidized to "throw mud" at MM. Ellissen and Cornuault for the remainder of their days. Let us, however, hope better things for the credit of French gas engineers, who may easily show some of our people an example of public spirit, common sense, and good manners, even if we cherish the national belief in our material superiority as gas technicians.

Whether in an associated body or privately, it may be expected that a considerable number of British gas engineers will see the result of MM. Ellissen and Cornuault's labours some time during the coming summer. Much as we may

be disposed to shake our heads over the wantonness that sanctioned the erection of the Eiffel Tower, we all secretly, if not openly, feel that we should like to look at this clever example of *bizarre* engineering construction. There is a good deal else to be seen in the Exhibition which will well repay a visit. The "Gas House" will probably be largely patronized; but the thought and expense that have gone to conceiving and carrying out this idea are paralleled in almost every department of French art and industry. A walk through the Exhibition grounds will therefore be a slice of liberal education worth the trip to Paris to obtain. We may condemn some of her vagaries, and be racially incapable of appreciating other traits of her character; but no student of the world he lives in can refrain from confessing that the share of France in the advancement of modern civilization is great, and her influence worthy of all regard. The English-speaking race and its Teutonic congeners may spread from their cradles in Europe over all the undeveloped lands of the earth, while the French stay at home; but a colony is not a nation, and the old races that made modern civilization are still its leaders. The world cannot do without France; and when France invites the nations to a display of her art, science, taste, and industry, the invitation is not to be neglected by anyone who desires to be a man of his time.

A BILL FOR THE PREVENTION OF "COMMISSIONS."

The Bill of Lord Randolph Churchill "for the more effectual prevention and punishment of Bribery and Corruption of and by members, officers, or servants of Corporations, Councils, Boards, Commissions, or other Public Bodies," has been read a first time and printed. The second reading is down for Thursday next, when it stands as the eighth order; but as the Government proposals relating to Naval Defence are to be taken first on that day, it may never be reached. As it is not blocked, however, it may go forward a stage on an early day. The Bill contains only four clauses and the preamble, and proposes to enact that every person to whom it applies who shall take or pay any private gift or advantage in respect of any contract or other transaction in which a public body is concerned, shall be guilty of a misdemeanour, and shall be liable, upon conviction, to be imprisoned for two years, with or without a fine of not exceeding £500. In addition to this penalty, the illicit payment is to be forfeited to the public body; any public office held by the offender is to be vacated; and in the case of a first offence he is to be incapacitated from public office for seven years from the date of conviction. In the event of a second conviction for a like offence, he is, in addition to the foregoing penalties, to be debarred office for ever, and his name is to be struck off the list of persons entitled to vote at a parliamentary or other election. Besides all this, officers and servants of public bodies convicted of such malpractices are to be held liable to forfeit their right to any compensation or pension to which they would otherwise have been entitled. It cannot be said that this proposed addition to the statute law errs on the side of mildness. It is uncompromising, austere, and curt to a degree. A certain discretion is allowed to the Court in the apportionment of the penalties; but the phraseology of the Bill is general and precise enough to make the measure very formidable to those whom it may concern. Not much opposition to the Bill is to be anticipated, although it may be amended in Committee. There is plenty of recent example of the need for such a stiffening of the law to furnish Parliament with the motive for carrying it into effect without avoidable delay. The passing of a law of such far-reaching operation will make officers and members of public authorities, and people doing business with them, wary of falling into each other's power. It should not only prevent corruption, but also clear the air of talk upon the subject. To whisper groundless suspicion of a man's integrity will be a more serious matter after such a law is passed than it is at present; for that which is now only misconduct, rendering an official liable to dismissal and a civil action, will be a misdemeanour visited by fine, imprisonment, and deprivation of civil rights to a considerable extent. We confess, however, to a desire for the like treatment of all who may be in a position to commit the like offence. The Bill does not touch directors and officers of trading companies, or persons occupying a fiduciary position in which they can betray their trust for private gain. It is difficult to perceive why the bribery of a public official should be a penal offence, while the corruption of a capitalist's agent should be unnoticed by the criminal law. It may perhaps be thought easier to begin at public officials, as these belong to a definable order of a community; but if the law of the land is to be placed abreast of the moral law in relation to this subject, it will be impossible to stop with them.

HALIFAX IN DARKNESS.

Since we mentioned the condition of the gas supply of Halifax last week, matters have gone from bad to worse in this distracted town. The Mayor, who probably thought himself a local demi-god when he appeared to "ride the whirlwind and direct the storm" which broke upon the devoted head of the late Gas Manager, has lived to prove the fickleness of mob favour. He, as Chairman of the Gas Committee, has had the town in darkness night after night; has been fain to place his person under police protection; and has been forced to listen to cheers from excited ratepayers for Mr. W. Carr, and clamours for his recall. It would not be in human nature if Mr. Carr did not feel in all this some amends for his wrongs. We have no wish to glorify Mr. Carr, or place additional difficulties in the way of his successor; but it cannot be denied that the new *régime* has done so far about as badly as possible. The saving in the Manager's salary, which was an incident of the change from a tried to a fresh officer, has been more than swallowed up by the wages of a Superintendent, who is an extra man; and the dissatisfaction consequent upon the introduction of an outsider has led to the sacrifice of all the old working staff. We are always loth to say anything against the free exercise of their discretion by a Gas Company or Gas Committee in all matters affecting workmen. We do not deny that workmen are often unreasonably troublesome with regard to those alterations of the system of management to which we referred last week as inevitable with a change of head. All the same, there must be something very wrong when the sacrifice of an entire staff is the price paid for maintaining the supremacy of head-quarters. There could not have been much the matter with the Halifax staff in Mr. Carr's time, or the works would not have gone on automatically as they did during his long absence to Australia for the benefit of his health. We regard the Mayor as mainly responsible for this trouble; for it is only an awkward outcome of the blundering that has marked his handling of the "gas question" since the agitation began. Truckling to an outcry has had its Nemesis. Somebody else must be offered up as a victim before matters can be set right in Halifax; and it is to be hoped that this time the right person or persons will suffer. The whole affair is a striking illustration of Corporation gas administration, in which the mass meeting controls the policy of the Gas Committee.

AN OUTSIDE VIEW OF THE RELATIONS BETWEEN GAS COMPANIES AND CONSUMERS.

The observations of the contributor who writes in another column, under the pseudonym of "A Wanderer," upon the mutual relations of gas companies and consumers, are worth reading as original, if not in all respects fresh contributions to the elucidation of an order of subjects that have always been interesting for gas managers. Our contributor ranges freely over a variety of topics; and it is not to be expected that everybody will accept his views of the matters which he discusses. He is undoubtedly justified in not under-estimating the existing competition between gas and electricity and mineral oil. Oil is at the bottom, and electricity at the top of the artificial light trade; yet, as the old German song says, "The dregs are at the bottom and the froth is at the top, but the good beer is in the middle." So we imagine that the bulk of gas manufacturers would be quite content to retain the middle place in the lighting trade, if they could but make sure of it. With regard to the opinion of the sliding scale entertained by consumers, we altogether deline to accept our friend's statement. He, as an outsider, is a little befogged himself on the subject, since he evidently means "original" when he speaks of "preference" capital. He curiously ignores, moreover, the essential motive of the sliding scale, which is that the self-interest of gas companies shall be enlisted in the cause of cheapened gas, by enabling them to divide a bonus by virtue of their efforts in this direction beyond a certain standard price. To urge, as our contributor appears to do, that the sliding scale should cease to slide for the Gas Company when they had paid 10 per cent., is to accept a contradiction in terms. As a matter of fact, however, we think he is altogether mistaken upon the point. The great majority of gas consumers know less than he does about gas companies' dividends; but they do know and care about the price of gas. The consideration, therefore, that gas in one place is to be had for 2s. 3d. per 1000

cubic feet, as against 3s. 6d. elsewhere, weighs very much more with the average consumer than the corresponding fact that the gas proprietors in the first town may be rejoicing in 18 per cent. dividends, while those in the second may with difficulty scrape together 10 per cent. If the circumstances of the two cases were explained to him, he would very probably exclaim, *à propos* of either or both, "And serve them "right!" The effect of money deposits in hindering the prompt payment of gas-rentals is worth attention as a point not made before, to our knowledge, during recent discussions of this subject. The case against quarterly accounts is well put; but this ground has been often gone over. It is quite true that custom is changing in favour of shorter reckonings as between purveyors and consumers of necessaries. Salaries which used to be paid quarterly are now commonly paid monthly. Tradesmen's bills which used to run to quarterly and half-yearly "books" are now-a-days discharged every week. The proportion of business transactions upon the condition of "cash with order or on delivery" bears an increasing ratio to the whole, as buyers and sellers grow to more and more appreciate the advantage of ready-money dealings. At the same time, there are some matters in which custom is hard to change. The majority of good dwelling-houses are held for rentals paid quarterly; the descent from these to tenements rented by the week being very marked. Bearing this consideration in mind, together with the fact of local rates being payable quarterly, it is quite arguable that gas-rental might be kept in the same category. We believe, nevertheless, in the benefits of monthly payments for gas in many cases, and have repeatedly praised the working of the system in Continental towns. Here, however, particularly with the Latin races, all commercial and fiscal payments are based upon a more uniform system than with us. Rents, rates and taxes, tradesmen's bills, gas—everything, in short, is paid for monthly. It is extremely easy to obtain credit for a single month; but very difficult to avoid payment for any length of time afterwards, except on purely personal grounds. All these things have to be taken into consideration when such an apparently simple matter as the customary length of credit for gas-rental comes up for settlement; and they do not render alterations easier of introduction.

THE SOUTH-WESTERN DISTRICT MEETING.

The South-Western District Gas Managers met last Tuesday at Bridgwater, under the presidency of Mr. J. H. Cornish, Manager of the Gas Company in this ancient, but during the last week or so decidedly water-logged, town. Fortunately, the worst of the recent floods had subsided during the day or two preceding the meeting, or it must have been postponed. Mr. Cornish, in his Inaugural Address, which was well received, gave a brief summary of the history of the Bridgwater Gas Company during the 30 years with which he has been identified with its fortunes. For a non-manufacturing place, the narrative of extension and progress is a very good one; the fact that Bridgwater is known chiefly as a not very lively-looking town on the old Bristol and Exeter section of the Great Western Railway being no evidence against the penetration of the gas administration by modern principles, as Mr. Cornish's statement sufficiently showed. After the delivery of the presidential address, Mr. J. J. Jervis, of New Swindon, read a paper on the question of dividing the hydraulic main into sections, instead of working long open lengths such as were once universal. Mr. Jervis had to "circularize" to get the information upon which his paper was based, the effect of which was seen in the irregular appearance of the author's data. The outcome of the paper and discussion was to show that the division of the hydraulic main into short lengths is a growing practice, being convenient in many respects, even when no very great or striking advantages can be traced to it as compared with the older plan. Mr. H. Sainsbury's paper upon retort scurfing was, like the preceding, a specimen of the kind of communication suitable for these district gas managers' meetings. The South-Western men are generally fortunate in their discussions; one powerful reason for this being the convenient size of most of the gas-works in this part of the kingdom, which are not too large to be looked after by managers who have every detail of observation and experience at their fingers' ends. Notwithstanding the wide extent of country covered by the South-Western Association, which draws its members from a region larger than the ancient kingdom of Wessex (the next meeting, by the way, is to be held in the old Wessex capital, Winchester), the gatherings are usually well attended, and the local character is fully maintained, though never obtrusive.

Essays, Commentaries, and Reviews.

THE AFFAIRS OF THE GAS INSTITUTE.

We reproduce below the text of a circular to members of The Gas Institute—signed by Mr. George Garnett, as President *pro tem.*—and Mr. William Longworth, as Honorary Secretary *pro tem.*, which reached us on Friday last. It is evidently the result of the Council meetings that have been held since our last communication from Mr. Longworth, mentioned in the Journal for the 5th inst. This, as explained at the time, was a private copy of the proposed amendments of the rules which the Council were prepared to recommend to the members. We naturally considered that the document in question would be distributed forthwith among the general body of the members, and made an observation to this effect. We were mistaken, however; for, as the result of inquiries, it appears that, for some unknown reason, the issue of the statement was stopped at the last moment. Perhaps it has been considered desirable, upon second thoughts, to preface the hard and dry matter of the revision of rules with an explanatory statement referring to the condition of affairs in general. If so, the idea is not a bad one; but readers of the circular will see for themselves how it has been carried out.

Gas Offices, Guildford, March 12, 1889.

Dear Sir,—Since the issue of the Council's last circular, several important events have transpired, and misrepresentations as to the position taken up by the Council have been made.

It may seem that they have been tardy in issuing this circular; but the many difficulties they have had to contend against, added to the fact that to secure a legal quorum the attendance of every member is requisite at each Council meeting, rendering haste impossible.

So long as they carry on the Institute, they are bound to work to the existing rules; and, in order that nothing illegal may be done, Mr. Radcliffe (Solicitor to the Institution of Civil Engineers) attends their meetings, and they are acting under his instructions. As you are aware, the Council consists of six members only, and the present rules do not provide for vacancies being filled up; but such power is contemplated in the new rules.

The most recent resignations from the Council took place because a majority of six to three voted against the following resolution on Dec. 11 last, viz.:—"That the Institute be wound up."

The three principal reasons which actuated the majority in declining to agree to the above resolution, were as follows:—

1.—Because they were not empowered, when elected to manage the affairs of the Institute, to dissolve it without the sanction of the members.

2.—Because they deemed it unwise and inexpedient to call a general meeting of the members at that time of the year, when many gas engineers cannot leave their works; and therefore such a meeting would lose its representative character.

3.—Because they thought it not impossible to so alter the rules as to preclude a recurrence of recent events, and satisfy a large majority of the members. They therefore reiterate the statements contained in their former circulars, as follows:—

Circular dated Dec. 21*st*:

"The Council wish to emphasize the fact that the late President and the minority desired to dissolve the Institute; the majority to maintain it intact until the members themselves could arrange what plan to adopt."

Circular dated Dec. 31*st*:

"Your Council are still of opinion that they would not be doing their duty to the members in recommending that The Gas Institute should be dissolved, until the members have had an opportunity of deciding on the matter; and that it would be most undesirable to hold an extraordinary general meeting of the members at this time of the year."

The rules are being revised, and will shortly be forwarded to the members, together with a copy of proposed resolution affecting traders. The Council are at one with the members generally as to the advisability of eliminating the trading element from the roll of the Institute; but the difficulties of giving effect to this desire in a drastic manner are very formidable. In submitting the intended amendments to the present rules, the Council assure you that they are not actuated by any unfriendly feelings towards anyone, but believe that such a policy is desirable for the welfare of the Institute; and they respectfully rely upon your support and consideration for their proposals.

The total number of resignations, including deaths, is under sixty.

The Council regret the resignation of Mr. Lass, the Auditor; but desire to state that such resignation was not caused by any action on their part.

The resignation of the late Secretary, Mr. Bennett, has been accepted; and Mr. F. F. Cates, Chartered Accountant, has completed the audit of the accounts to Dec. 31 last, copy of which will be forwarded. He is also empowered to take over for the present, from Mr. Bennett, all the books and property belonging to the Institute.

The Council believe that by placing the proposed alterations in the hands of members on an early date, their revision will occupy a comparatively small portion of the time of the June meeting, and they hope that those members who have the time and the inclination for contributing papers on that occasion will do so, and thereby assist the Council in making this session as successful as any previous one from a technical point of view.

Being anxious to have the new Council for next year as representative as possible, the Council beg to remind the members that, according to Rule 30, the 31st of March inst. is the last day for nominations of Members of Council; and they will be pleased if members will give their attention to this matter.

The Council find that there is a considerable difference of opinion amongst individual members on the following points:—

1.—Whether the annual general meeting should be held at Brighton, as already decided on, or in London. The Council are of opinion that a more representative meeting can be held in London than Brighton.

2.—Whether the excursion to Paris should take place after the June meeting, as originally contemplated, or be abandoned.

A form for replies to the above queries, and addressed envelope, is herewith enclosed; and the Council will be pleased if you will fill up and return same *within seven days*. In the event of a sufficient number of members being in favour of proceeding with the Paris trip, the Council think that a Special Committee might be appointed to make all the necessary arrangements.

In conclusion, the Council have great pleasure in reporting the receipt of a large amount of subscriptions, and a considerable number of letters from members, in London and other parts of the United Kingdom, approving their determination to hold intact the Institute until the next general or extraordinary meeting; and though they are placed between two opposing elements, they are in hopes that the energies of the members will assist them in the direction of unity.

GEORGE GARNETT, President (*pro. tem.*).
WILLIAM LONGWORTH, Hon. Sec. (*pro. tem.*).

The first thing that strikes a reader of this statement is the painful conviction that, in whatsoever other respects the present administration of The Gas Institute may be an improvement upon the old, it is not in respect of literary skill. It is not to be wondered at that the remnant Council long for two Secretaries, if this is the best they can obtain, in the way of diction and grammar, under their present arrangement. We draw attention to this imperfection of its phraseology at the outset, because by so doing we shall be relieved from the necessity of dwelling upon the point in discussing the matter of the circular in detail.

It will be noted that the circular lays down without reservation the proposition that "so long as they [the Council] carry on the Institute, they are bound to work to the existing rules." By way of commentary upon this very laudable declaration, we would ask the Council to explain under what rules they have (*a*) usurped the functions of the Finance Committee; (*b*) appointed a President *pro tem.*, when Rule 12 says that "in the absence of the President and Vice-Presidents a *Chairman shall be appointed* from the other members of the Council;" (*c*) contemplate the possibility of holding an annual general meeting at any other place than that decided upon at the previous annual general meeting. We admit that they could not very well help nominating an interim Committee to act in matters of finance; but every act of such Committee is *ultra vires*, and done at the personal risk of the individuals composing it until condoned by the members in general meeting. Force of circumstances can hardly be pleaded for the other cited action and proposal whereby the Council illustrate their respect for the rules. The suggestion to hold the meeting anywhere else than in Brighton is an incitement to a glaring illegality.

So much for law; now for fact and opinion. In the fourth paragraph of the circular it is stated that the last split in the Council took place on the mooting of a resolution—"That the Institute be wound up." There is a little confusion here, for the "last resignation" from the Council was that of Mr. J. Stelfox; but this, for some reason, is not mentioned in the circular. When they speak of the "last resignations," Messrs. Garnett and Longworth refer to the withdrawal, in December last, of the late President and Messrs. Cross and Peaty. Then they go on to explain; and a very remarkable explanation it is. In their "reasons" for rejecting this resolution, the Council (who were then the majority of a larger body) state, firstly, that they were "not empowered" to dissolve "without the sanction of the members"—to which it is sufficient to rejoin that nobody ever said that they were, as a Council, able to do anything of the sort. Secondly, they deemed it "unwise and inexpedient to call a general meeting of the members at that time of the year when many gas engineers cannot leave their works." But there is not a word about an extraordinary meeting, or the time of holding one, in the cited resolution. These two "reasons" are inconsistent with each other; for if the Council were expected to dissolve the Institute, as the first implies, whence the necessity for an extraordinary general meeting for the same purpose, the calling of which is implied in the second? The third reason loses itself at the end in two references to circulars issued by the Council, as to both of which it seems to us that the late President and the minority who retired with him have reason to enter a protest. There is a plain assertion that these former colleagues of the present Council wished to dissolve the Institute *without consulting the members*—which is absurd on the face of it, since only the members could carry into effect any such recommendation made by their governing body. Mr. H. Woodall saw that dissolution and reconstitution was the only way out of the difficulties in which he found the Institute, and desired to lay this view before the members with a recommendation based thereon. The majority, who now constitute the remnant Council, would not hear of any such course, and committed themselves to the responsibility of getting the Institute out of its straits *without dissolution*. They would not even consent to postpone the matter, and let it be laid before the members in the form of majority and minority reports of the Council; but drove their President and those who thought with him into resignation, as the only alternative to remaining to carry out the decrees of a majority with which they fundamentally disagreed. Hence it is not the late, but the present, members of Council who have endeavoured to prejudge the action of the members in general meeting.

In the sixth paragraph the Council say they are "at one with the members generally as to the advisability of eliminating the trading element from the roll of the Institute." How do they know, as a Council, what are the views of "the members generally" on this or any other point that has never been made the subject of a vote or even a circular of inquiry? This is a pure assumption on their part, and must be treated as such. As to the felicitation which the Council permit themselves in the following paragraph, respecting the number of resignations, it is easy to overrate the value of this figure as a testimony of confidence in their policy. It is probable, if one could know the amount of money received on account of subscriptions since the beginning of the year, and compare it with the receipts for the corresponding period of last year, that the point would have fresh light thrown upon it. The present Council must not even assume that all subscriptions paid signify support of their policy; for doubtless many have come to the credit of the Institute from bankers, whose authority to pay (in the form originally supplied by Mr. W. H. Bennett for the convenience of members) has, by inadvertence, not been revoked by some of those who have actually resigned. Others we know of, who intended to resign, upon finding that their bankers had paid their subscriptions, decided to hold on for the sake of having a word and giving a vote at the next meeting. And this is the idea of many who have neither formally resigned nor paid their subscriptions. Practically, the number of members who have virtually decided to "cut" the Institute cannot be determined either by the number of formal resignations sent in to Mr. Longworth or of the adhesions to Mr. Colson's Committee. If the Council of the Institute are disposed to rely upon the former piece of evidence, they are leaning on a broken reed, and showing a shortsightedness strangely inconsistent with that perspicacity which enables them to declare by intuitive knowledge that they are in agreement with the bulk of the members in regard to the treatment of traders.

The Council regret the loss of Mr. Lass; but apparently do not care for his old colleague, Mr. Hersee. We have already dealt with the question of the proposed alteration of the place of meeting; but may be permitted an expression of surprise, after all that has been said, at the suggestion to meet in London rather than in Manchester, in order to secure a representative gathering. As to the Paris trip, it is unnecessary to explain why the Council are undecided whether or not to carry out the arrangement made last June. The final paragraph of the circular is merely an attempt at a peroration, and may be taken for what it is worth in individual opinion. Upon the circular as a whole we have no hesitation in declaring that it is a lamentably weak and ineffective production to be put forward as the manifesto of a party in the Institute who have had since Dec. 11 last to prepare a statement of policy. It does not meet, even by a promise, the explicit declaration from the other side as to the impossibility of rehabilitating the Institute. Quitting all other points of the circular, and taking only the confession of the Council that the "drastic" elimination of "the trading element" which they desire is difficult of accomplishment, we put this plain question to them: Are they prepared to come before the members with a proposition, *backed by competent legal opinion*, for attaining this object by any means short of dissolution? Unless this inquiry can be answered in the affirmative, it will be idle for the Council to proceed with the tinkering of the rules, and waste of money and pains for them to issue any more argumentative circulars.

THE LONDON COUNTY COUNCIL AND THE GAS AND WATER UNDERTAKINGS.—The motion which Mr. James Beal has signified his intention of submitting to the County Council in regard to the acquisition of the gas and water undertakings of the Metropolis, to which reference has already been made in our columns, stands second on the *agenda* for the meeting to-day, and therefore it will in all probability be reached. It will not, however, slip through unopposed, inasmuch as Captain James intends to move an amendment to the effect that it is inexpedient to take Mr. Beal's proposition into consideration "until sufficient time has elapsed for the Council to have thoroughly mastered the duties at present conferred on it."

THE PROPOSED FIRE-BRICK SYNDICATE.—Adverting to the announcement in the JOURNAL for the 5th inst. of the suggested formation of a Syndicate in the fire-brick trade, we understand the proposal is to arrange a "Fire-Brick Union," with a capital of three millions, and to acquire the whole of the fire-brick works not only in the Stourbridge and Dudley district, but in Yorkshire. With this view, negotiations have been proceeding among mine-owners and fire-brick manufacturers, and meetings have been held in Birmingham, as also at Derby and Leeds. The transactions at these meetings have been kept strictly private; but there is reason to believe that the project has now advanced so far that it is expected a decision will be speedily arrived at—whether to carry out the idea in a practical form or to abandon it. Information is refused as to the names or the number of firms who have signified their adhesion; but it is rumoured that the proportion to the number in the trade is 99 per cent. The North Staffordshire Correspondent of *Industries*, writing last Wednesday in reference to the project, said: "In case of the scheme being carried out, it is not unlikely that prices will be advanced from 50 to 100 per cent. on the lowest rates which have prevailed; and there does not appear to be any likelihood of a contraction in the consumption to hamper the Syndicate's operations. It is not so improbable, however, that other deposits of equal value may be brought into work. Already in this district there is one firm of fire-brick manufacturers which is producing a brick that seems capable of standing the strain of blast-furnace use; and when the clays in other parts come to be analyzed and tested, it is likely that the proposed monopoly of the Syndicate may be defeated."

GAS AND WATER COMPANIES IN THE STOCK MARKET.

(For Stock and Share List, see p. 543.)

The general tendency of the Stock Markets during the past week has been dominated by the wave produced by the "Copper Collapse." Opening weak for the most part, at one time they manifested a disposition to improve, but fell back again upon fresh apprehension that the end of the trouble was not yet in sight; and pretty well everything closed very flat. The Money Market keeps steady, without any show of tightness. The Gas Market has been fairly active, though one or two days were very quiet. The movements have been irregular. Gaslight "A," which had closed on the previous Saturday rather unsteady, was put down 1 on Monday. It did not, however, waver from that point; and, being steadily and moderately dealt in throughout the week, closed without further danger. The secured issues have been in fair demand. In South Metropolitans, a few transactions in "B" have been marked at moderate figures; but the other issues were untouched. Commercials continue quite stagnant, save for a solitary transaction marked in the old. The Company will hold its ordinary general meeting on the 5th prox.; and it is said that the accounts to be presented then will make the meeting a very pleasant one for the proprietors. Suburban and Provincial undertakings have been quite neglected, except two or three little dealings in British, at good average prices; but the quotation of both Brentfords is 1 higher. Among the Foreign division, Imperial Continental has been flat; and on Wednesday an exceptional amount was done specially at the low figure of 209. However, the stock looked better by the close. In Continental Union, there was a tendency to reaction after the recent rise. The fully-paid shares were quoted 1 lower; but there is no appearance of their going lower. Buenos Ayres is ½ higher; and San Paulo sellers have put their price up 1. Other undertakings in general are steady. In the Water division, there is nothing remarkable. Lambeths have made some advance, and Southwark and Vauxhall exhibit a variety which may be pleasing, but is certainly perplexing—one issue going up 1, and the other going down 1.

The daily operations were: Only moderate Gas business on Monday—mostly in the three Metropolitan Companies. Brentfords rose 1; but Gaslight "A" and Continental Union fell 1. A little business was done in Water, at middle figures. Tuesday was unusually quite; only three transactions altogether being marked in Gas, and the same number in Water. Wednesday was much brisker; but prices were only moderate, and Imperial Continental receded 1½. In Water, Southwark 7½ per cents. fell 1. On Thursday, Gas was dealt in to about the same extent as the preceding day; but prices showed a better tendency. Buenos Ayres rose ½. In Water, Southwark ordinary went up 1. Gas was a shade quieter on Friday; but prices were well maintained, and San Paulo rose ½. Water was very quiet; but Lambeth 7½ per cents. advanced 2, and the debentures 1. About an average amount of business was done on Saturday in Gas, and at very fair prices. Water was quite neglected. All quotations for both Gas and Water remained unchanged.

ELECTRIC LIGHTING MEMORANDA.

THE HEISLER SYSTEM OF ELECTRIC LIGHTING—THE AFFAIRS OF THE WESTINGHOUSE COMPANY—ANNUAL GENERAL MEETING OF THE BRUSH COMPANY—BLUNDERING OF THE LONDON ELECTRIC SUPPLY CORPORATION.

A new American system of electric lighting, controlled by the Heisler Electric Light Company, has appeared to dispute the field with the older methods. Particulars of the application of this system to the lighting of the city of Wabash, Indiana, have recently come to hand. It seems that Wabash was the first city in the United States to adopt the tower system for lighting the streets; but some time ago a change was found desirable, and improvement was sought in the direction of a better distribution of light by the use of a greater number of lamps of small candle power at a regular and convenient distance apart, "thus obtaining an equal amount of illumination in every part of the city, no matter how remote from the centre." This quotation is from the *Progressive Age;* and is calculated to raise a smile from those old-fashioned people who scouted the fantastic "tower system" from its introduction, and have lived to see experience and common sense triumph once more in this reversion, for "improvement," to the old as contrasted with novel practice. We learn from the newspapers that "the large majority of the citizens hailed the change with enthusiasm and delight." Probably the same words, or others to the same effect, hailed the advent of the now derided tower lights; for your typical American newspaper reporter glories in catching the public sentiment of the hour, which is notoriously fickle and shortsighted. It cannot be said, however, that the aspect of a town lighted by the Heisler system commands the approbation of a critic who entertains a prejudice against the disfigurement of streets by day for the sake of facilitating their illumination by night. Posts and wires mar the frontages with that hideous cross between telegraph lines and the scaffolding for a firework display which electricians admire as the acme of scientific attainment in electrical distribution. The poles are from 25 to 35 feet high, ranged along the curbs of the street pavement; and carry two wires upon cross-arms at the top, from which short wires droop to an incandescent lamp carried by a bracket sticking out at right angles to the post. The whole thing has a makeshift aspect, which may accord with the framed and clap-boarded house-fronts of mushroom Western towns, but scarcely agrees with old-fashioned notions of what is commonly respectful to the eye, to say nothing of the picturesque. In what the peculiar advantages of the Heisler system of lighting are supposed to consist, we have no information.

The Westinghouse Electric Company have held their annual meeting; but the proceedings were of an interim character, in view of pending arrangements for extending the Company's business in the Eastern States of America and in England, which rendered it impossible to present a complete report. Mr. George Westinghouse, jun., the President of the Company, made a statement to the shareholders, in which he explained that the business during the past year had been prosperous, and that the earnings up to Dec. 31 were more than sufficient to pay the quarterly dividend of 1¼ per cent. Important acquisitions and amalgamations of other electrical companies signalized the year; among others being that of the Waterhouse—a young rival Company possessing valuable inventions. By acquiring the Consolidated and Sawyer-Mann Companies, the Westinghouse Company provided themselves with patents and a manufacturing business in incandescent lamps, which they previously lacked. They are now fighting the Edison Company on these patents. To indicate the progress of the Westinghouse system, it was stated that the orders received for central station apparatus since the beginning of the current year aggregate a capacity of 50,000 16-candle lamps. Taking the lamps and details generally into consideration, the average price for each 16-candle power lamp capacity is $8. The three lamp factories now under the control of the Company are said to be capable of turning out at least 18,000 lamps daily.

The eighth ordinary general meeting of the Brush Company was held on Wednesday last, when the results of working summarized in the last issue of the Journal were further explained to the proprietors by Lord Thurlow, the Chairman of the Company. The Chairman's speech was of the most optimistic character, being dashed only by reference to the great lawsuit between the Company and the Edison and Swan Company, out of regard for which the dividend of 5 per cent. which might have been paid was put aside to meet possible contingencies. Still, so good did the Chairman think the Company's position and prospects, that he challenged any other Company of the same class to show anything so satisfactory. The volume of business transacted is reported to have tripled during the past five years; while the gross profits have increased by 254 per cent.—in amount, of course. The Company have two central station lighting installations in hand—at Chelsea and Bournemouth—both of which Lord Thurlow eulogized as likely to prove models of their kind to the world at large. Seeing that every electrical station is designed differently from all others, and that nobody betrays any urgent desire to copy the Brush system as exemplified in the town or the country installation, this is a bold prophecy on the part of Lord Thurlow. Electricians are nothing if not prophetic, however; and as his electrical Lordship for the nonce left off prophesying the approaching extinction of gas lighting in London, it was necessary for him to dilate upon some other hope of the future.

The reported behaviour of the London Electric Supply Corporation in the parish of Deptford is not of a character to impress the world with the good faith or business tact of the management. The Clerk of the Greenwich District Board of Works has reported to his Board that the Corporation had excavated roadways in Deptford and commenced to lay mains; but that he had stopped them. Apart from the absence of statutory rights, the Corporation ought to have done their mainlaying at night and in the manner prescribed by the officers of the Board, instead of which they had entrusted the supervision of the work to two gentlemen who seemed to have had no experience whatever in digging trenches and laying pipes, but employed 100 men out of the streets and did the work anyhow. The Manager and Secretary of the Corporation have since apologized to the Board, who nevertheless have ordered all the work done to be taken up again, accompanying the passing of a resolution to this effect with some observations as to this attempt of the Corporation to steal a march on the public.

PROSPECTS OF IMPROVEMENT IN CARBONIZATION.

The rise and progress of the Dinsmore gas-making project naturally attracts attention to the principles of coal carbonization as generally accepted by British gas engineers; and it need not surprise us if here and there somebody is found disposed to ask the question whether it can be possible for the trained experts to have overlooked any such opening for improvement as that which Mr. Dinsmore claims to have detected. There is nothing unreasonable in such an inquiry, for nobody has ever claimed finality in connection with the ordinary method of coal distillation. Indeed, there are more than one or two points of carbonization which the most experienced engineers are loth to regard as closed to all investigation, although as a matter of fact they find it convenient on the whole to adhere to established rules, and confess freely that historical attempts to depart from them have not been happy. We do not propose upon the present occasion to discuss the Dinsmore process, because the data upon which the final judgment on this scheme must be pronounced are not as yet available. So far as we know, there has not been any thorough examination of the process and its working results by competent and disinterested authority, such as should be arranged for if the owners of the Dinsmore patents mean business on a large scale. We say this without any desire to discredit those who have brought the process to its present stage of development; but merely to show that we are justified in maintaining the reserve which we have hitherto exhibited towards this so-called novelty in carbonization. Mr. Dinsmore comes before the world and claims to have evolved,

out of very private experience, an improvement in coal distillation for gas making which has eluded the observation of all the generations of gas engineers, chemists, and experts of various types who have been engaged in the gas industry since the days of Murdoch. By what appears to be the simplest modification of the usual plant, he states that he secures results which, if substantiated, should bring him the Birmingham Medal of The Gas Institute—whenever this guerdon of merit is again bestowed—as well as other rewards of an equally gratifying and more useful order. The only reply that we can give to these claims is, for the present, to take note of them and await confirmation. On the face of it the *onus* of proof lies with the Dinsmore people. All experience justifies reserve and incredulity. It is to be hoped, however, that gas engineers as a body have sufficient of the modern scientific spirit to hold themselves open to conviction by any respectable questioner of even their most trusted experiences. In the case in point it must be held, notwithstanding, that a hearing is as much as Mr. Dinsmore and his friends can expect. Every step beyond they must win by force—the force of the hardest and most indubitable facts—if they seriously pretend to surpass all established practice, and upset all experience. We do not at all envy them their task for the immediate future. Supposing, for the sake of argument, that they can make good their claims, the worst of the difficulty will remain. The moment their invention, if so it may be described, is found to possess a money value they will have to look out for their patent rights; for such is the way of the world. We regard this ambitious scheme with some tenderness, for any practical attempt to introduce new methods into gas making must possess a certain interest, and the hardest heart must pity an object of interest when beset with troubles, deliverance from which appears well nigh impossible.

The peculiar interest of the Dinsmore process is that it touches some of the problems of carbonization which face all gas makers at one time or another. Coal breaks up under the influence of heat into solid, liquid, and gaseous products, the respective qualities and quantities of which vary within a limited but still important range according to temperature and time. Any intelligent man entrusted with the management of this disintegrating operation must be incurious indeed if he does not occasionally ponder over the phenomena occurring under his eyes, and try to ascertain the importance of those variations of result which are within his power to bring about. So much more gas for so much less fluid or solid—so much more fluid for a decrease of gas and solid—an addition to the weight of solid residuum at the expense of the gas and fluids; these are the elementary cares of the distillers of coal for different purposes. Out of the unit weight of the raw material certain products are obtainable, with an inevitable loss due to that "cost of exchange" which must be paid by all manufacturing transmutations. What all these results mean in precise quantities and values is a question that may be either answered from hearsay or settled by personal investigation. Every painstaking gas manager possessed of the most ordinary facilities for satisfying his laudable curiosity in this respect, may be supposed to be capable of drawing up a balance-sheet of any particular description of coal in which he is practically interested, where the 2240 lbs. of raw material shall be put on one side and its products on the other. We do not speak now of the sperm value of the gas obtained from a coal, which is a different consideration; but merely of the distribution of the products by weight.

No sooner is this simple balance struck with reference to different descriptions of coal, however, than further questions arise. The distribution within a certain range of the various kinds of products by weight is, as already pointed out, a consequence of temperature as well as of the nature of the raw material. The time element also enters into the question, and affects not only the weights but even more the qualities of the resultant products. It is an elementary statement that, looking at only one of the products of carbonization, the gas is better at some periods of the distillation of a charge of coal than at others. It is not quite so hackneyed a truth, however, that the average quality of the gas made from any coal is improved by blending the products of different periods of the charge, as in the ordinary way of working multiple settings of retorts. Now, this cannot mean that the better portions of the gaseous outputs—from the gas manager's point of view—are improved by admixture with the worse; but that the latter, which, as Mr. Folkard has shown, may possess a negative value in sperm, are improved by association with the accompaniments of the former. We say the accompaniments, because unless the improvement comes from the impoverishment of one portion of the gas for the benefit of the other—which is a contradiction of the record—it must necessarily come from something else. The only known source of this additional equivalent of sperm in a mixed gas is the tar. The natural inference from this way of stating the case is therefore that the poorer portions of the gas acquire some illuminating value from the tarry vapours that accompany the richer portions, and which would otherwise go to the tar well. It thus appears that it must be advantageous to the gas maker to provide a proportion of poor gas to mix as quickly as possible with that from the richer portions of a charge, for the purpose of abstracting something from the tar of the latter. In the ordinary way of working, this result follows (as it were) without prevision; but it remains to be considered whether the provision could not be improved upon by design, and whether the operation could not be extended with advantage.

The most obvious way of effecting the former object would be to turn the gas coming from a retort, say, after the fourth hour of a six-hour charge into the middle of another retort at the end, say, of the first hour. These times, of course, are merely chosen for the purpose of illustration. Let us suppose that there are the usual two ascension pipes at the ends of a through retort; each pipe being capable of working either into the hydraulic main or into the mouthpiece of another retort similarly fitted. During the first hour or so, both ascension pipes might be open only to the hydraulic main; but at this period one might be closed in this direction, and admission given at the same end to the gas from the last of another charge, which would consequently pass through the whole length of the retort and mingle with the best portions of the gas then coming off. Then comes the second question, of extending the operation. This might be done by turning steam into the worked-off charges for as long or as short a time as might be desired, either before or after the normal period of drawing the coke. Carbonic oxide and hydrogen would result from the injection of a steam jet, carrying with it a little air, as might be managed by leaving an annular space round the steam nozzle open to the atmosphere. In this way would be obtained a poorly luminous mixture of gases available as carriers of hydrocarbons that would otherwise be condensed, and hot enough to fix some vapours in the form of permanent gases. This is the rudest sketch of a process that might succeed with some coals and fail with others; and is put forward merely as an indication of an order of ideas that may be said to be constantly "in the air" of a modern gas-works. The Dinsmore process is interesting as being an incursion from one side into this debateable region, which ordinary carbonization methods skirt but do not traverse. Together with the unsolved problem of continuous carbonization, this desideratum of increasing by some modification of treatment during distillation the gaseous product of coal supplies the most interesting opening for the ingenuity of the gas maker. Its difficulty constitutes its charm. It must be mentioned, however, by way of caution, that the commercial benefits of any process of this order, although successful in a technical sense, may very easily be overrated. Gas cannot be made from nothing, free of cost. Whether tar, or coke, or steam be consumed in the manufacturing process, their value (with the charges of the apparatus employed) must be set down to the debit of the account; and, when this is done, it must not be a matter for surprise if the balance remaining for the fortunate inventor should prove to be little else than the glory. To a professional gas engineer this might appear to be sufficient; but it would scarcely recompense an outsider for the expense of carrying out such a difficult business.

On Wednesday last, Mr. Charles H. Beloe, M. Inst. C.E., delivered a lecture at the School of Military Engineering at Chatham, to the officers of the Royal Engineers, on the "Purification of Water and Sewage by the Magnetic Spongy Carbon Process," introduced by the International Water and Sewage Purification Company, Limited, of London. The lecture was illustrated by diagrams and samples of the materials used and of the results obtained by the process.

The Philadelphia Natural Gas Company, who have almost a monopoly in the business at Pittsburg, are taking steps to prevent the present wasteful use of this fuel. Professor Forbes recently gave an instance of this in connection with the Westinghouse electric lighting station, where he was informed that no precautions are taken for the economical use of the gas, and no meter is used—the Company simply renting a 5-inch pipe. The Philadelphia Company are therefore introducing meters; and hereafter a rate of 12½ cents per 1000 cubic feet, with a discount of 20 per cent. for cash, is to be charged.

We have received from M. St.-Claire Deville, Engineer-in-Chief of the experimental works of the Paris Gas Company at La Villette, a copy of the collected extracts from his report on the experimental investigations on gas coal carried out by him at the above-named works, which was prepared in connection with the inquiry into the general working of the Company ordered by the Commission appointed early in 1885 to adjudicate upon the question of the price of gas. Since the report was first issued, the various matters dealt with therein have been further investigated; and any fresh facts which have come to light in connection therewith have been recorded in the form of notes, so as to keep the original text intact. The value of the author's labours has necessarily been greatly enhanced by these *addenda* to his already important work.

The problem of the direct mechanical production of light continues to attract attention; and from time to time statements are published respecting the bases upon which research in this direction may be most hopefully conducted. According to the *American Engineer*, Professor C. F. Brackett recently delivered an address before the Electric Club of New York, in which this question was touched upon. Professor Brackett's idea is that of causing a ray of light to make a vibration in a conductor of electricity, and to measure the result by a special dynamometer, with a view to producing the same vibrations by other means, and so obtain light directly from the conductor. The problem is essentially to produce waves of the same length as light-waves, or, in other words, to produce light-waves mechanically. As Professor Brackett puts it, he has to work the sum backwards. This is not the only problem in which the conditions of a satisfactory solution can be more or less clearly defined without rendering the solution any nearer of attainment. The mechanical equivalent of light has never been determined; but when this is done, it does not follow that the reverse effect can be produced.

THE TRADESTON GAS-WORKS OF THE GLASGOW CORPORATION.

In accordance with the provisions of their Special Act of Parliament obtained last year, the Glasgow Corporation Gas Commissioners are at present busily engaged in the reconstruction and extension of the South-Side or Tradeston Gas-Works, the ownership of which passed into their hands from the Glasgow Gaslight Company in the year 1869. At one time it was thought likely that the works in question might with advantage be given up in favour of a new establishment on a very large scale at some distance outside the city; but, on all the circumstances of the case being carefully considered, it was deemed prudent to retain the old site, and to secure additional ground for extensions sufficient for many years to come. As may be remembered, the Act of last session authorized the Gas Commissioners to raise and spend a sum of £150,000 in securing the additional ground required, and in the erection of suitable works upon the extended area, and stocking them with the requisite plant to carry on the operations incident to a great gas concern. The works have been planned with great care by Mr. W. Foulis, the Engineer-in-chief to the Corporation Gas Trust; and they have been so designed that he will be in a position to carry out his most advanced views in reference to the economy of the gas industry. The operations now resolved upon, and which will be put into execution within the next few months, do not involve the expenditure of the whole amount provided for by last year's Gas Act; but they will eventually be carried out. As has previously been mentioned in the JOURNAL, the erections and plant already contracted for will exhaust something like £60,000 of the vote; and, in addition, there is the ground now being added to the works, and which extends to about 14,000 square yards. This has been obtained from the Caledonian Railway Company, to whom belongs a large portion of the land in this part of the area through which the municipal boundary passes.

The site of the Tradeston Gas-Works has long been in two sections; the division being chiefly effected by the Clydesdale branch of the Caledonian Railway, which throws off a section to the Mineral Terminus on the south-side of Glasgow Harbour; while another section becomes continuous with the Glasgow and Greenock line of the same railway system. There has also been a stretch of Lilybank Road which has hitherto served to cut the site of the works into two sections. This, however, is now shut up to the public; and it is embraced within the area owned by the Gas Commissioners to the south of the railway branch just spoken of. It is in the southern section of the site that the two large gasholders are placed, which are such conspicuous objects near the southern boundary. They are two-lift holders each having a capacity of about 1¼ million cubic feet; and in their rear to the south a large space of ground is being reserved where, in course of time, there will probably be erected a holder having a diameter of 250 feet, and a capacity of probably 5 million cubic feet.

Work is progressing very actively in both sections of the site. All the manufacturing operations will still be conducted in the northern portion of the works; but the purifying process will be relegated to the southern part, where also will be constructed the meter house, together with some other erections of minor importance. In what may be called the old works, where there are the retort-houses, &c., practically every building will by-and-by be razed to the ground, though for a time, however, at least one of the retort-houses will be retained, so as to assist in maintaining the general supply of gas in the city and suburbs. The site hitherto occupied by these old retort-houses with some additional ground, is rapidly being made available for a new retort-house and coal-store of gigantic proportions. They will together cover an area measuring 322 feet by 301 feet, and will afford space sufficient for four benches of retorts, all of which are to be arranged on the Siemens system. Fully one-half of the enclosed space will be occupied as the retort-house; and the lesser half will be the covered coal-store. Two benches of retorts, each containing seventeen double ovens, are now to be erected. There will be eight retorts in each single oven; so that there will be 272 in each bench, and 544 in the two benches. A chimney will be erected for each retort-bench, having nine ovens on one side and eight on the other. Its height will be 100 feet from the floor, and its diameter 8 feet; and there will be an internal lining of fire-brick. It is contemplated that the house shall have 1088 retorts, all of unusually large size—⌂-shaped, 21 inches by 15 inches, and 9 feet in length. Of course, they have single ends.

As we have said, nearly one-half of this immense enclosed area will become the coal-store, and will be traversed by two lines of railway from a high-level system, which will be run at a height of 17 feet from the floor level, and will be continuous with the Caledonian Railway on the south, coming from the Barrhead branch. The side walls of the retort-house and coal-store are to be 35 feet above the floor-level of the retort-house, underneath which there will be the producer-floor, whose height is to be 8 ft. 6 in. Carried on steel girders, supported on cast-iron columns, the retort-house floor will essentially consist of a layer of Lindsay's patent steel "trough" flooring, on the top of which there will be laid a course of dressed granite paving blocks or slabs. Most ample provision is being made for the thorough ventilation of the producer-floor, the details of which need not at present detain us. From the floor of the retort-house down to the producer-floor, there will be broad flights of stairs. The roof of the retort-house and coal-store will be formed in two spans of 88 feet and 78 feet respectively; and the length will be 301 feet. It is to be carried on lattice girders 6 feet deep, which are to be supported by cast-iron columns, reaching to a height of 31 feet. In length, the girders will range from 45 feet to 64 feet. As regards the yard level around the retort-house, we may mention that it is intended to be 4ft. 6in. below the retort-house-floor; and the whole of this great erection will be surrounded by a railway inclining from the high level to the low. The coke will be stacked in the yard at the low level; and, if desired, it may there be loaded into the railway waggons.

Still speaking of the northern section of the works, we may here romark that the new lime-kilns will be erected quite near to the coal-store, at a spot near where the high-level railway passes over the main line of the Caledonian. At this place there is a gasholder tank 100 feet in diameter, from which the holder was recently removed by the Airdrie Iron Company, and re-erected at the works of the Partick, Hillhead, and Maryhill Gas Company. The tank is being utilized in two ways. A large portion of it is to be turned to account as a tar-tank; and the whole will be roofed over by means of brick arches, and added to the yard area. At one side three very substantial brick piers are being erected which are to support the high-level railway where it inclines down into the yard. Near by the condensers, exhausters, scrubbers, boilers, &c., are to be erected.

Passing to the southern section of the works, a lattice girder bridge has here been thrown over the railway. It is 10 feet wide, and has a floor formed of Lindsay's steel "troughing," on which is to be laid a finish of cement concrete. This is a footway; but it is also an arrangement for carrying large pipes across to the purifier-house. Going to the most southern point of the site of the works, we come to a siding which is brought off from the Barrhead branch of the railway beyond the Maxwell Road. It comes under that road by a steep gradient along the western boundary of the gas-works enclosure, where much new ground has been taken in. Here there is a heavy retaining wall built of rubble masonry. The new line of railway after entering the works divides and subdivides, throwing off numerous sidings; and the main portion of it runs along to the eastern boundary of the enclosed ground, and bends round to the north to pass over the Caledonian main line by means of an iron plate girder bridge, having a span of 70 feet, and carrying two lines of rails, one of which leads to the coal-stores and the other inclines down to the yard level.

The new works in the southern section include the purifier-house, the meter-house, lime-store, &c. The purifier-house is an immense building, but only one-half of it is being constructed at present. When completed, it will be 100 feet in width and 350 feet in length; the walls being 27 feet high. The space enclosed is sufficient for four sets of 35-feet purifiers, with all the necessary mechanical appliances. Eight of these purifiers are now being made by the Barrowfield Iron-Works, Limited, of Glasgow. A line of railway passes through the purifier-house along the east and west sides; the support being given by a series of dwarf walls of brickwork and cast-iron columns. The roof of the house is in two 50-feet spans, both curved, and covered with galvanized corrugated sheet-iron. In the centre line there are two columns which support bowstring girders, which in their turn bear the roof girders. They are 11 feet deep in the centre, tapering to 2 feet at each end. These girders are each about 85 feet long. The purifiers are being provided with hydraulic centre-valves, and with 20-inch connections. To the east of the southern continuation of the purifier-house, there is the meter-house, which is 86 feet long by 34 feet wide. Concrete seats are being provided for three station-meters—one of them lately ordered of Messrs. R. Laidlaw and Son, of Edinburgh and Glasgow, and one to be removed from the old works. The site of the third meter will not be occupied for the present. The roof of this house will be of iron, of the pavilion style, and slated. The lime-shed, which is now building, is near the north end of the purifier. It is to be 120 feet long by 40 feet in width. A railway siding will run into it.

In the event of good weather being obtained, it is confidently anticipated that by August, gas will be made in the new retort-house, and all the other arrangements are to be completed so as to deal with the gas. To accomplish such a result, Mr. Foulis will have to keep his contractors and their *employés* as "busy as nailers;" for most assuredly they have a lot of work to do.

THE Board of Trade have appointed Major Marindin to hold an inquiry early next month with reference to the various applications for Provisional Orders and Licences under the Electric Lighting Acts, which they have received in respect of the Metropolis.

IN our "Notes" column to-day, reference is made to the successful utilization, by Messrs. Brown, Barnes, and Bell, of gaslight for the purposes of photography; the burner employed being the "Cromartie," manufactured by Messrs. W. Sugg and Co., Limited. A very interesting trial of the new system was made at the Liverpool branch of the first-named firm on the evening of the 8th inst., under the supervision of Mr. Simmance, Messrs. Sugg's local Manager. Eight lamps, each of 50-candle power, were used; and several very perfect negatives were obtained by exposures varying from 10 to 20 seconds. Before the light was rendered very actinic, an exposure of not less than 60 seconds was necessary, even in a much stronger light. The eight lamps employed in the recent operations, having a total illuminating power equal to 400 candles, are so economical in working that the cost of gas does not, it is stated, exceed ¾d. per hour.

Notes.

Photography by Artificial Lights.

In a recent number of *La Nature* there appears an article upon photography by artificial light, in which the possibility of taking negatives by other than sunlight is shown to be a consequence of unceasing progress in the direction of increasing the sensitiveness of the prepared plates. The first kinds of artificial lights to which photographers had recourse were the electric arc and ignited magnesium, both of which are very suitable for the purpose, by reason of their richness in actinic rays. The former is used to a considerable extent not only for photography of the ordinary kind, but also for trade purposes in connection with the various photo-mechanical engraving processes. Magnesium is more convenient for lighting up dark interiors intended to be photographed; but it has the disadvantage of producing a thick white smoke which rapidly obscures the scene when the place is small and confined. In order to avoid this inconvenience, it has been successfully proposed, as reported by M. Albert Londe, to employ a flashing composition containing magnesium powdered with oxidizing substances. In this way an artificial flash of great brilliancy may be obtained, lasting quite long enough to give a good negative with the rapid processes now in use. Or, even better, powdered magnesium may be blown into the flame of a spirit-lamp. It should be recorded, however, that for ordinary photographic purposes—that is to say, portraiture—perfect success may be secured with the least possible trouble by merely lighting the studio with good high-power gas-lamps. The great heat of the flame of a recuperative gas-burner is the means of developing a higher actinic effect than is attainable by open flames. We have seen some admirable portraits taken by Messrs. Barnes and Bell with the aid of "Cromartie" lamps. This means of prolonging the business hours of photographers, by enabling them to work satisfactorily by gaslight, only needs to be indicated to become general.

Keeping Red Lead Plastic.

Red lead putty joints are commonly preferred by fitters for steam and other pipes, although it is not the cheapest composition suitable for the purpose. If it is made up long before it is required for use, according to the ordinary method, whatever care may be taken to cover it from the air, it will harden by degrees, and often require to be broken up and kneaded afresh in order to restore it to the condition necessary for its proper use. This is the result of the reaction which is produced in oils in presence of certain metallic salts, in which those of lead are included. The oil oxidizes, becomes resinous, and the mass containing it sets and hardens promptly in consequence. If it is desired to avoid this inconvenience by only preparing the red lead putty in small quantities at the moment of using, it becomes a costly composition, on account of the labour entailed in the preparation. If a small proportion of heavy tar oil, or oleonaphtha, as the French designate it, be mixed with the putty, it is said to be possible to make a store of this in advance, without fear of its losing plasticity or setting. Seeing what quantities of red lead are commonly wasted in fitting-shops and on outdoor jobs, this hint from a French source may be worth attention.

Coke as "Earth" for Lightning Conductors.

The advantages of coke as facilitating the connection to earth of the bottom ends of lightning conductors, are recognized by the Italian Ministry of War. According to a recent order, the lower ends of lightning conductors fixed to Italian military buildings must be connected to a sheet of lead more than 2 millimetres thick and 1 square metre superficial area, or to a cylindrical cage formed of iron bars filled with coke and surrounded with a sheet of metal. Signor Baretta has invented a new "earth" for lightning rods composed of a corrugated sheet of iron or copper forming a cylinder 0·80 metre diameter and height. All the corrugations are studded with points inside and out, and the free edges of the sheet are cut into saw teeth. In this way a large surface of contact with the soil is ensured, with consequent rapid discharge of electricity. When the subsoil is dry and rocky the inventor digs a trench 1·5 metres deep, placing a layer of broken coke in the bottom, upon which a corrugated sheet is laid. More coke is placed upon this sheet, and then a second sheet is put down in electrical connection with the first. A third layer of coke is placed over all; and the soil is then rammed into the rest of the space available to the ground line. The coke holds the damp and makes a safe "earth."

The Working of Deep Coal Mines.

The question of the approaching exhaustion of the coal measures of the United Kingdom lends interest to the examples that are supplied in Belgium of coal mines worked at a greater depth than is generally necessary on this side of the Channel. The Poirier seam in the Charleroi district is exploited by a company who take out of it 200,000 tonnes of coal yearly by two shafts, one of which (the St. André pit) is 940 metres (3084 feet) deep. This is said to be the deepest pit in the world. It has been carried deeper and deeper as required by the exhaustion of the higher seams, which have been worked since 1834. The shaft is prolonged another 15 metres below the level named, which is that of the lowest worked seam, in order to form a sump; but the quantity of water collected is very small. The gear of the shaft is capable of working to a depth of 1000 metres or more. Flat steel wire rope is used for hoisting; the weight lifted every time being about 16,910 kilos (nearly 16¾ tons), which is comparatively enormous. The lift takes 80 seconds. The most interesting question concerning the working of coal measures at these great depths is the increasing heat of the rock, and the consequent necessity for abundant ventilation. The temperature of the ground rises on the average 1° C. for every 30 to 40 metres of depth, which would mean an elevation of 25° C. for a depth of 1000 metres, and bring the temperature to about 35° C. (95° Fahr.). At St. André the ventilation is provided by a Guibal fan 6 metres in diameter, the air sent down by which reduces the temperature in the waggon-ways to 24° or 25° C. The theory of the augmentation of temperature following depth is illustrated by the fact that at the working ends of the galleries the temperature is 33° C. On the whole, it is considered that the good results of the working of the Poirier seam at the depth of 1000 metres show that there is no cause to fear the element of depth in coal mining. This conclusion proves that the coal reserves of the world will not be speedily exhausted.

A Pyrometric Telescope.

An instrument called the pyrometric telescope of MM. Mesuré and Nouël is described in a recent issue of *La Nature*. It is designed to facilitate and render exact the estimation of furnace temperatures by simple inspection. The inventors are engineers of the works of St. Jacques of Montluçon, belonging to the Chatillon-Commentry Iron Works Company. The most simple form of the instrument is only 4 to 5 inches long, and somewhat resembles a single opera glass. It is based upon the phenomena of rotatory polarization, and comprises two Nicol prisms, an analyzer, and another polarizer, the principal sections of which make an angle of 90°, with a quartz plane between. The effect of this disposition is to cause the apparent rotation of the polarized ray according to the length of its wave. The length of wave varies with the colour of the lights observed, which depends upon the degree of incandescence of the radiant body. If, therefore, there are any means of measuring this deviation, one can immediately conclude as to the temperature of the incandescent body. For this purpose the analyzer is made moveable, and may be revolved on its axis in the interior of the telescope, so as to cause the principal section to make any angle with the polarizer. An index fixed before a graduated circle permits of the measurement of this deviation; the zero point corresponding to complete extinction. If the incandescent body is observed through this instrument by slowly revolving the analyzer the light is seen with a certain colour, variable according to the temperature; and this tint disappears at a certain angle of rotation, which consequently serves to determine the temperature. The instrument contains also an object and an eye-glass to permit of focussing. It is constructed by Ducretet, of Paris, after the inventors' designs; and has been in regular use for more than a year by the foremen of the Saint-Jacques works, by whom its indications of the temperature of furnaces and metals are said to be much appreciated.

The Dangers of Water Gas.—References have from time to time been made in the Journal to the danger attending the use of water gas. The Proceedings of the Institution of Civil Engineers contain an account of the effect of this gas on the workmen in a hat manufactory near Zurich, who were attacked by various forms of illness—manifesting itself in headaches, dizziness, vomiting, debility, &c. The matter was investigated by Herr H. Schiller, of Zurich, who furnished the following particulars:—In the preparation of the hats, iron moulds were used to press the felt; and these moulds were heated by numerous small jets of water gas, of the description furnished by a Dowson generator. The factory inspector satisfied himself that the illness was probably caused by the diffusion of the unconsumed gas which passed into the atmosphere, in consequence of the liability of many of the small burners to become extinguished. The author, who was charged to inquire into the behaviour of the Dowson gas, gives a sketch of its composition and preparation, and an account of the use of water gas in America, where it is employed for illuminating purposes. Water gas is only now used for lighting and heating at one place in Switzerland—in Messrs. Sulzer's works at Winterthur; but Dowson gas has been introduced in several different localities. The points the author had to determine are formulated in a series of propositions, eleven in number, which deal with the effects of a mixture of the gas with the atmosphere on animals, the least quality actually fatal to life, the percentage harmful, the toxic agent in the gas, the symptoms of Dowson gas and water gas poisoning, &c. An apparatus of special design was contrived to prepare mixtures of Dowson gas in various proportions, an illustration of which is given. A number of experiments were conducted with cats, rabbits, guinea-pigs, mice, and frogs, the results of which are set forth in tables, and similar experiments were carried out with water gas. The conclusions arrived at are as follows:—As the gases are devoid of smell, it is only when evolved from fuel containing sulphur compounds that an odour of sulphuretted hydrogen is perceptible. Both gases are strongly poisonous. The symptoms are identical with those of poisoning by means of carbonic oxide gas. A fatally poisonous mixture is an atmosphere with about 1 per cent. in the case of water gas, and 1·5 per cent. in the case of Dowson gas. Symptoms of poisoning are produced by about 1 part per 1000 with the former, and 3 parts per 1000 with the latter gas. In non-fatal cases a rapid recovery, as a rule, ensues. The poisonous principle is the carbonic oxide gas,

Communicated Articles.

THE CHEMISTRY OF ILLUMINATING GAS.

By Norton H. Humphrys, Assoc. M. Inst. C.E., F.C.S.

XI.

Having examined the subject of illuminating gas from a general point of view, in respect to commercial considerations, and to hygiene, &c., we now proceed to inquire somewhat more closely into its nature and properties. The first necessary for this purpose is to know "what it is made of?" and in reply to this question it is proposed to select a few examples from the numerous published analyses of gas as ordinarily supplied.

In 1851, Mr. John Leigh, of Manchester, furnished the following particulars in the course of an article* on this subject:—

—	Gas from Ince Hall Cannel.			London Gas from N'wc'stle Coal.
Carbonic acid and aqueous vapour	1·53	1·40	2·32	—
Illuminants	8·50	8·35	8·51	3·83
Oxygen and nitrogen	4·32	4·32	6·82	2·07
Light carburetted hydrogen	34·02	41·40	38·40	37·63
Hydrogen	41·00	37·88	37·84	52·83
Carbonic oxide	11·35	6·66	6·10	3·64
	100·72	100·01	99·99	100·00

Dr. Frankland, in the course of a lecture delivered at the Royal Institution in 1853,† quoted the following as an example of the composition of coal gas:—

—	Gas from Newcastle Cannel.	London Gas.			
Light carburetted hydrogen	51·20	35·25	35·28	41·50	40·60
Hydrogen	25·82	51·81	50·24	47·60	41·15
Carbonic oxide	7·85	8·95	7·40	7·32	8·02
Carbonic acid	0·13	0·00	1·28	0·53	0·29
Nitrogen	1·51	0·38	1·80	traces	5·01
Oxygen	0·43	0·08	0·44	0·00	1·26
Hydrocarbons	13·06	3·53	3·56	3·05	3·67
—	100·00	100·00	100·00	100·00	100·00
Illuminating power in candles	34 40	14·40	14·10	13·00	11·50

In the course of a lecture delivered before the British Association of Gas Managers in 1864,‡ Dr. Letheby stated that the constitution of coal gas at the outlet of the purifiers was as follows:—25 to 50 per cent. hydrogen; 35 to 52 per cent. light carburetted hydrogen; 3 to 20 per cent. illuminants, including olefiant gas (C_2H_4), propylene (C_3H_6), butylene (C_4H_8), and other hydrocarbons of the series C_nH_n, benzole (C_6H_6), and acetylene C_2H_2; carbonic oxide 5 to 9 per cent.; carbonic acid 0 to 2 per cent.; aqueous vapour 0 to 2 per cent.; oxygen and nitrogen 0 to 9 per cent.; also traces of cyanogen, ammonia, carbon disulphide, and sulphohydrocarbons.

In 1876, some analyses of London gas were published in the *Journal of the Chemical Society* by Mr. T. S. Humpidge.* He examined seven samples of gas, with the following results:—

—	Imperial Company's Gas.	Chartered Company.					
		Common Gas.					Cannel Gas.
Hydrogen	40·82	50·59	50·26	50·62	50·68	43·99	41·72
Light carburetted hydrogen	36·57	38·39	36·95	34·49	35·89	39·36	41·88
Illuminants	4·18	4·41	3·22	4·11	4·06	4·12	6·72
Carbonic oxide	6·79	3·13	4·37	6·96	3·98	6·42	4·98
Nitrogen	9·73	3·48	4·98	3·22	4·93	5·40	2·71
Oxygen	1·91	—	0·22	0·60	0·26	0·40	—
Carbonic acid	—	—	—	—	traces	traces	—
	100·00	100·00	100·00	100·00	99·82	99·67	100·00

The table at foot is given by M. Guéguen,† in a paper on the "Chemical Theory of the Production of Illuminating Gas." Nos. 1 and 2 are by Bunsen, operating on Heidelberg gas; No. 3 by Bonn, at Landolt; Nos. 4 and 5 by Wunder, at Chemnitz; Nos. 6 and 7 are respectively samples of London common and cannel gas; Nos. 8 and 9 are quoted in another part of the paper,‡ and represent Vienna and Gandensburg gas respectively.

The following are extracted from a table accompanying a paper read by Dr. James Adams before the British Association of Gas Managers in 1881,‖ on the subject of heating by gas:—

—	Manchest'r Gas. Bunsen.	London Gas.					
		Imperial Co.	Great Centr'l Co.	Chartered Co.	Humpidge's Analyses.	Frankland.	Roscoe
		Aver.	Aver.	Aver.	Aver.		
Hydrogen	45·58	41·15	51·24	51·80	47·83	50·28	47·60
Light carburetted hydrogen	34·90	40·66	35·28	35·26	36·94	36·95	41·53
Illuminants (olefiant or equivalents of olefiant)	6·46	3·67	3·56	3·53	7·02	6·34	6·97
Carbonic oxide	6·64	8·02	7·40	8·95	5·27	4·37	7·82
Carbonic acid	3·67	0·29	0·28	—	—	—	—
Nitrogen	2·46	5 01	1·80	0·38	5·29	—	—
Oxygen	—	1·20	0·44	0·08	0·56	—	—

* See Journal, Vol. II., p. 144. † *Ibid.*, Vol. III., p. 156.
‡ *Ibid.*, Vol. XIII., p 411.

* See Journal, Vol. XXX., p. 380. † *Ibid.*, Vol. XLII, p. 1094.
‡ *Ibid.*, Vol. XLIII, p. 957. ‖ *Ibid.*, Vol. XXXVIII. p. 42.

—	1	2	3	4	5	6	7	8	9
Hydrogen	44·00	44·37	39·80	51·29	50·08	46·00	29·70	47·23	40·41
Light Carburetted Hydrogen	38·40	38·30	43.12	36·45	35·92	39·50	50·00	35·49	44·40
Carbonic oxide	5·73	5·56	4·66	4·45	5·02	7·50	6·80	10·19	4·87
Illuminants	7·27	9·40	4·75	4·91	5·33	3·80	13·00	5·22	5·30
Nitrogen	4·23	5·43	4·66	1·41	1·89	0·50	0·40	1·26	1·60
Oxygen	—	—	—	0·51	0·54	—	—	0·26	0·41
Carbonic acid	0·37	—	3·02	1·08	1·22	0·70	0·10	0·35	2·99
Water vapour	—	—	—	—	—	2·00	2·00	—	—

THE RELATIONS OF GAS COMPANIES AND CONSUMERS.

By "A Wanderer."

"There is a tide in the affairs of men,
Which, taken at the flood, leads on to fortune;
Omitted, all the voyage of their life
Is bound in shallows and in miseries . . . .
We must take the current when it serves,
Or lose our ventures."

These words, originally expressed with regard to the destinies of individuals, strike me as being peculiarly applicable to the affairs of gas companies at the present time. A time for special action comes to all; and surely it has now come when the managers of gas undertakings should make special efforts for the further ensuring of their position, and placing their affairs upon a firmer financial basis. To buy in the cheapest, and sell in the dearest market, is, as it ever was, the first principle of all commercial enterprise. And so long as the British public are satisfied that they buy their cheapest illuminant of the local gas company, so long, and no longer will they patronize that undertaking. Speculation is rife as to the prospects of coal gas as an illuminant; and whilst I would not countenance any merely alarmist theories, yet I feel that the situation is one which demands careful consideration. The commercial status of gas companies at the present day is a matter of vital interest, not unmixed with anxiety, to those responsible to shareholders for the present and future success of these undertakings and this not without reason.

The present is, by general consent, a time of severe competition; and we, as gas producers, are not exempted from this healthy stimulus. We have at present only two serious competitors to face—viz., oil and electricity. The hold which the former has on the British working classes is an evidence of its adaptability to their requirements. Why it should in this respect take a foremost position relative to coal gas, we shall see further on. Be it noted, however, that the oil trade is not carried on by jumps and starts, and with a flourish of trumpets, but is by slow and steady progress working its way into a sound financial position. Our friends the electricians are not idle either—far from it. They have looked with longing eyes upon our "Land of Goshen," and will spare no effort and lose no opportunity to wrest from us, if possible, the cream of our trade.

A vital element in the success of our undertakings is the relationship which exists between the gas company and their consumers. How this relationship can be constantly improved is a matter of grave importance, and should be ever-present in the minds of managers and directors. That great dissatisfaction often actually exists, is unhappily only too evident. It has been the pleasure of the writer, as "a wanderer," to mix constantly with the gas-consuming public, and to hear their opinions upon gas matters generally—sometimes tinged with unwarrantable condemnation of gas officials generally and of directors in particular; and I purpose laying before your readers a few suggestions based upon the consumers' point of view, with a hope that their consideration may result in furthering the good work of establishing a mutual confidence between the two contracting parties—the producer and the consumer.

Amongst a certain class of consumers, a long-standing grievance is, of course, the so-called "monopoly" enjoyed by the gas company. Such consumers are, however, always ready to break down their own argument by threatening to at once commence burning oil, which they know, of course, "is both cheaper and more convenient than gas." They thus inadvertently prove that, after all, it is not very much of a monopoly that gas suppliers possess. The best way to deal with such men is doubtless to let them enjoy their grumble—it is their safety-valve; manifesting on our part a disposition to hear what their grievances may be. As a rule, such are, with the exercise of but a ittle patience, fairly readily satisfied.

Curiously enough, the gas consumer has his own ideas respecting the sliding scale. He is quite agreeable to the arrangement under this system up to a certain point. So long as shareholders are content with an ordinary dividend, allowing the consumer to share with them the profits of the undertaking, he is satisfied. But it is a question which the intelligent consumer does not lose sight of, as to the wisdom of a trading concern like a gas company taking such high dividends as now seem to be the rule, especially in the Metropolis. Should not a company rather be content to pay (say) to its preference shareholders a dividend of not more than 10 per cent., and the remainder to receive their dividends at a correspondingly reduced scale—the extra profits accruing from the arrangement being devoted to further reductions in the price of gas; thus increasing the business of the company, and, by popularizing the use of gas, enhancing infinitely the commercial stability of the concern? This is not put forward by the consumer as a demand, but as merely his view of the subject; he basing his opinions upon the principles which guide him in the management of his own affairs and in dealing with his trade competitors. Taking into consideration, therefore, the circumstances already referred to, I do not hesitate to bring these suggestions under your readers' notice.

The deposit, or money security system, again, is another source of constant irritation. There is no reasonable doubt that any trading concern placed under such statutory obligations as those laid upon a gas company, should also be provided with exceptional means for protecting its interests and properly securing its revenue. It is, however, in the means adopted for enforcing the powers conferred by Parliament in connection with this system that the friction between company and consumer may be largely allayed or intensified. This subject is one that may be considered in conjunction with another matter to be referred to later on—viz., short-period contracts. As the term of contract is shortened, so, of course, can the amount of the security required be proportionally reduced.

To the collector, the deposit is certainly not an unmixed good. An aged gentleman, who had followed the profession almost all his life, recently referred to deposits as a great bar to prompt payment. Experiencing more difficulty in collecting such of the company's accounts as were covered by money securities, he arrives at the somewhat unwarrantable conclusion that the whole system is bad. Whilst, no doubt, the consumer supplied under a deposit contract is at times more independent with the company's officials than he otherwise would be, yet, on the whole, the greater trouble experienced in getting in this source of revenue is probably much more due to the class of consumers supplied under this system than to any defect in principle of the system itself. I would here, however, suggest the propriety of fixing the amount of money security, where required, at the lowest possible figure; and doubtless, wherever practicable, it should be dispensed with altogether. A means of attaining this end—and one which is evidently growing in favour with both company and consumer—is the indemnity contract system. As a matter of course, the ideas of the company's officials and the consumer may, and do, often differ very widely as to who may be considered a satisfactory security; but on the whole, the system is one that is well worthy of careful consideration. It is one, however, that must be carried out very cautiously; otherwise the company will be constantly hampered in the collection of their accounts by more or less serious complications.

Another scheme which I am inclined to view with considerable favour is one of reference between companies themselves, by which information can be readily communicated in respect of consumers passing from one company's district to another, either Metropolitan or Provincial. By this means important data may be obtained—say, in circular form—relative to the precedents and general business character of customers who, on leaving the district of one company, are applying for a supply of gas elsewhere. The irritation consequent upon the "inevitable demand for a deposit" may often be thereby obviated. Were this plan more generally resorted to, I believe the results would be eminently satisfactory to company and consumer alike.

We will now turn our attention to a subject which is believed to affect the progress of gas companies more than any other—viz., the quarterly contract system. This is, of course, the most convenient to the company's officials; but if gas companies are to cater for the general public, they must consider primarily the convenience of their consumers. Are the latter best served under the quarterly contract system? I find (still guided by the expressed opinions of many gas consumers) that this is not so. Public companies, local authorities, and leading business firms very largely make up their accounts quarterly; and their arrangements are accordingly satisfactorily met by the existing custom of the gas company. But the smaller tradesman and householder, and particularly the well-to-do artizan, do not approve of the system as applied to them. Whilst, as they say, they would hardly feel the amount that might be due for gas on a monthly or a weekly contract, yet when an account for three months or thirteen times these amounts comes in at the end of the quarter, they find it a much more serious item to deal with. Consequently, in many cases the bill is put on one side, to be paid when more ready money is available. The collector calls again and again; irritation ensues; a bad feeling is engendered; and the account remains unpaid for two or three months, as the case may be. The gas supply is going on meanwhile; and if, on the one hand, the bill be paid on (say) a cut-off notice, it is only a matter of a week or two before in comes another account, and the whole trouble has to be gone through again. If, on the other hand, the gas supply be discontinued, and the amount due to date made up, it is found that four, five, or six months' gas has now to be paid for before any further business can be done between the consumer and the company. Is it altogether to be wondered at if such a customer, who at the best of times finds it a difficult matter to "make ends meet," refuses to have any further dealings with the gas company—preferring to burn oil and put up with its inconveniences?

Further consideration of the position in which gas suppliers stand with regard to their most important competitor—the oil trade—reminds me that oil for illuminating purposes is retailed at so much per quart, and is, as a rule, supplied weekly to its consumers, and "at their own doors." The reason for the large consumption of oil is twofold—first, the convenience which this retail system is to the artizan classes, who receive their income in weekly or more frequent payments; secondly, the cheapness of the illuminant, and the smallness of the outlay, or first cost, necessary to its introduction into the home or workroom. Here, then, is an important secret of the success of the oil trade; and whilst we are ever ready to enlarge upon the disadvantages and dangers attending the use of oil as an illuminant, let us be wise in time, and see how far it is practicable to meet our adversary on his own grounds, and to beat him with his own weapons. Another item not to be lost sight of is the absence of red-tapeism and officialism on the part of the retailer of illuminating oils, which is unfortunately considered by many to be characteristic of a gas company's representative.

In bringing forward this subject of short-period contracts I am not treading upon new ground. But there seems to be a tendency on the part of the management of most gas companies to rest on their oars in respect of this matter. Objections there certainly are to the system under review. Collectors do not like the idea. But why? Because in most cases the burden of the extra work entailed in the collection of the accounts is, most unfairly, wholly laid upon them. It is a moral certainty that the revenue derived under such a system cannot be collected for as small an outlay as is the case with quarterly accounts; but it is a question whether the enhanced business done under the proposed system would not soon compensate for the slight increase in collection expenses, and doubtless the business would rapidly be found to be on a much sounder footing commercially than is the case now, under the rule of high dividends and limited custom. I should be prepared, on a future occasion, to discuss in detail the plans which might be adopted to facilitate the introduction of this, to many companies, new phase in their operations. For the present, I merely bring forward the suggestions as based upon the wishes of a large class of Metropolitan and Provincial gas consumers.

Before finally leaving this subject of contracts and security, I will refer to a course which is largely adopted amongst provincial gas companies, and which I feel to be well worthy the attention of all—viz., the allowance of a discount for prompt payment. However small this discount may be, I am of opinion that the inducement it offers to the poorer class of consumers and (to use a well-understood term) "bad payers" to pay up promptly, would, by reducing the bad debts and the expenses of collection, soon recoup the company for the consequent small reduction of revenue. We cannot help experiencing a partiality, too, for an arrangement which provides for the supply of gas to "good payers" at a slightly reduced price as compared with that charged to the class of consumers who always put the company to a heavier expense in the collection of their accounts. The system might be confined to such consumers as do not avail themselves of the more convenient monthly contracts, preferring to remain quarterly consumers. However, whether the allowance be made all round or only on a class of accounts, I would urge the consideration of the subject on all who have at heart the welfare of the gas profession.

As an example of perseverance and ingenuity devoted to the cause of popularizing coal gas as an illuminant, I would point to the new prepayment meter. While refraining from the expression of any opinion upon the commercial prospects of this invention, I cannot but admire the ingenuity and originality of its inventor. There is evidence, too, of mental perception of the requirements of the lower and middle classes by the inventor of this little instrument, which (alas that it should be so!) undoubtedly places him far in advance of many of our gas engineers and directors. It is this very perception of the actual wants of a community that may direct a policy which would be crowned with surprising success.

It is, however, hardly to be expected that a board of directors, the members of whom probably are drawn from a considerable distance from the district their company supplies, should be in harmony and touch with a class of folk they have never seen and know nothing of. Hence the absolute necessity of a thorough

communication between the board and their customers through the subordinate officers—chiefly the collectors, and (where there are such) the district inspectors. This incidentally brings under notice the need of a mutual confidence and thorough harmony between the officers and the board or engineer or manager. Without this confidence, the value of the intermediate communication with the consumers will be lost. If the undertaking is to be a success, it is surely necessary that "the powers that be" should be most cordially in touch with every officer under their control. Considering further the "intermediate communication" between producer and consumer, which has been referred to as essential to complete prosperity, how can this be best attained? Collectors are, as a rule, non-technical men. They have their own duties to perform—often very unpleasant, and for which they are certainly not overpaid. They understand their work thoroughly enough; but with regard to technical and other matters connected with the consumers' requirements outside the ordinary routine of their duties, they neither profess to be, nor are they, competent to deal with them. The same may be said with regard to the fitters and other officials brought more or less into contact with the consumer.

In the Metropolis and large provincial towns, it is usual to employ a number of district mains inspectors, whose duty it is to see after the company's outside workmen, to keep an oversight over the distributory plant of the company, and generally to superintend the mechanical operations outside the works. These men can, however, but in few cases boast of anything of a technical education. They are probably good superintendents of labour, and as a rule, there is not much demand for anything but an ordinary amount of intelligence from them. Some years' experience of constant moving in and out amongst gas consumers has assured me, however, that this is not all that is required for the attainment of the "intermediate communication" now under consideration.

It has long since been recognized that the public require educating in gas matters. Is this being done? If so, how? Is it by allowing the local gas-fitter to do what he likes with the consumers' fittings, and call his work "Gas-fitting in the best style and on the most moderate terms?" He advertises: "House of five rooms fitted up for three pounds," &c. The house *is* fitted up, the gas company puts on a supply, but the unlucky consumer's satisfaction is very short-lived; his pipes being almost immediately waterlogged or choked, in some cases with solder at every joint. Or is it by leaving the consumer in the hands of the itinerant retailer of gas-burners, gas-regulators, &c.? If the whole of the trashy burners now being foisted upon the gullible British public were by some means gathered together and turned into the hard cash for which they have been exchanged, the amount realized would be startling!

A propos of the vagaries of gas-fitters, I may here mention a case which was only recently brought under my notice, where a consumer had within the past four months paid £40 for refitting and re-arranging the gas supplies for a church. He was nevertheless in great trouble about a serious escape of gas, to detect which he had repeatedly engaged the services of a local gas-fitter. He called in the representatives of the gas company, who, after a thorough examination of the company's meter and service-pipes, reported the escape to be in the "consumer's own fittings;" and by the rules under which he was acting, he was forced to refer the matter back to the consumer—thus leaving him in a worse dilemma than ever. Surely it is high time that gas companies obtained powers for fitting up entire premises where requested by the consumer, or, at all events, to be able to exercise some control over the pipes and fittings which are to convey their commodity to the point of combustion.

One of the best means, however, in my opinion, for educating the public is to engage the services of a technical man who would move amongst consumers as the company's representative, and whose primary duties would be to advise the individual customer on all matters connected with gas consumption. He might be the district inspector, where that individual formed part of the company's staff; or he might be one of the collectors. In either case his ordinary work should be curtailed correspondingly with the new duties imposed upon him. But he should be a man well acquainted with all the newest gas appliances of every description. He should also be acquainted with the chemistry of gas consumption (for heating, illuminating, or other purposes), and understand more or less the principles of mechanics, so that he would be thoroughly competent to advise the consumer on every phase of gas consumption for public, private, or trade purposes. He should be a man of pleasant bearing, as an important point always to be borne in mind by him is that he is at all times to avoid friction between his company and their customers, and to allay it whenever it has been engendered. He should have power to thoroughly examine consumers' fittings when accounts have been disputed, with a view to the detection of escapes, &c.; to deal with the testing of meters; and, whenever necessary, to explain the reading of meter indices, and to advise the consumer as to the adaptability to his requirements of wet and dry meters respectively. It might be readily understood between the company and the consumer that in the information thus given (which should, of course, be the best at the disposal of the inspector) the company should not be in any way compromised; and my experience goes to prove that such an officer would be most cordially received by the gas consumers at large, and would do much to enhance the mutual confidence between the latter and the company by whom they are served, which is so essential to perfect commercial success.

In conclusion, I would urge upon gas managers and boards of directors that the first principles of successful trading are to cater for the requirements of the public whom they serve, and that, too, in such a way as shall best attract the custom and win the confidence of their patrons. A veteran in the gas world recently observed that we shall soon have to go cap in hand to solicit the honour of the public's custom, "as they did when he was young." Whether this be so or not, it is surely incumbent upon all who wish well to the gas trade to put on one side, as far as may be, all mere red-tapeism; to substitute, wherever practicable, for the obnoxious "statutory notice for deposit" personal interviews or other means of deriving necessary information; and to eschew on every possible occasion, such elements of irritation as have up to the present time given gas companies a reputation for high-handed dealing which would be simply ruinous to ordinary tradesmen. The foregoing remarks are not made in any carping spirit; nor do I presume to bring forward any new ideas. I simply wish once more to review the position in which gas producers stand with regard to the general public; and to bring under your readers' notice some suggestions based upon an experience of the gas consumer which does not fall to the lot of the majority of the gas fraternity. Should any of my remarks be instrumental in leading to the adoption of a course of conciliation and consideration (now unhappily rare), the results, I am assured, will give rise to lively satisfaction alike to gas managers, directors, subordinates, and to customers.

Technical Record.

SOUTH-WEST OF ENGLAND DISTRICT ASSOCIATION OF GAS MANAGERS.

The Half-Yearly Meeting of this Association was held at Bridgwater last Tuesday, and passed off very pleasantly. The proceedings commenced by an inspection of the gas-works, after which followed an adjournment for luncheon at the Clarence Hotel. Here the members were joined by Mr. G. B. Sully, Mr. F. J. Thompson, and Mr. F. L. Carslake, Directors of the Gas Company. The business meeting was held at the gas-works at half-past two, with the President (Mr. J. H. Cornish, Engineer and Manager of the Bridgwater Gas Company) in the chair.

General Business.

In the course of the preliminary business, the following gentlemen were elected members of the Association:—Mr. W. L. Copp, of Watchet; Mr. F. M. Harris, of Barry; Mr. D. Irving, of Stapleton, Bristol; Mr. E. J. Lloyd, of Avon Street, Bristol; Mr. F. Osmond, of Dorchester; Mr. J. H. Silcox, of Pembroke Dock; and Mr. F. Turner, of Ringwood.

It was decided, on the motion of Mr. J. Lowe, of Weymouth, seconded by Mr. H. Sainsbury, of Trowbridge, that the next meeting should be held at Winchester; and Mr. T. W. R. White, of Sherborne, gave notice of his intention to propose an alteration in the rules at that meeting.

The Inaugural Address.

The President, in the course of his address, said he appreciated the visit of the Association to Bridgwater as a compliment to himself and to the Company in whose employ he had spent nearly thirty years. In the course of that time, the affairs of the Company had increased and improved. The number of consumers and of public lamps had more than doubled; the annual make of gas had increased fivefold; the price had been reduced from 6s. 6d. to 3s. per 1000 cubic feet; and the unaccounted-for gas had been reduced from 18 to the low figure of 3½ per cent. Lately, however, the consumption had not been increasing so rapidly. The population of the district did not grow very much; and there was also the question of the competition of oil. How this could be met—whether by letting fittings on hire, by short-period collections, or by prepayment meters—was an important consideration; for unless the business increased, further reductions in price were almost out of the question. Certainly, the value of tar and ammonia was rising; but then he noticed there was every prospect of a serious advance in the price of coal. Having called attention to some circumstances of local interest, the President referred to the working of a Dempster regenerator furnace in his retort-house, as yielding increased and more uniform heats with less fuel; also to a new arrangement for letting air out of the purifiers when freshly charged and brought into use. Alluding to the affairs of the Association, he pointed out that it was steadily increasing in numbers, and made appropriate reference to the recent decease of one of the members—Mr. Mountford, of Andover. The importance of each member doing his best to aid the objects of the Association was dwelt upon; and the President concluded by touching upon the subjects to be brought before the meeting.

After a vote of thanks to the President for his address had been carried, on the motion of Mr. Sainsbury, seconded by Mr. S. W. Durkin, of Southampton,

Mr. Jervis's Paper.

Mr. J. J. Jervis, of New Swindon, read a paper entitled, "To what Extent are the Advantages claimed for Separate Sections of the Hydraulic Main realized in Practice?" He had, he said, written to several managers of gas-works for information on the subject, but found that either very few works had at present adopted the practice, or that the managers did not altogether like to reply to an inquiry. He had addressed his inquiries to gentlemen outside the

Association, not wishing to deprive any member of the opportunity of giving the benefit of his experience at the meeting. He asked five questions, which were as follows:—(1) Do you find the separate system a remedy for choked ascensions? (2) How often are the contents of the hydraulic run out? (3) Do you work with or without seal; and if the former, how much? (4) Do you find less carbon deposit? (5) Had you before introducing the system ever been seriously inconvenienced by requiring isolation of any particular bed of retorts? From the replies received, he found there was still some difference of opinion as to whether stoppages were caused by the hydraulic seal. Two or three of those who replied had tried both seal and anti-dip, and had not been troubled in either case. One said the separate sections facilitated cleaning the mains, but did not entirely do away with chokes; and several found no benefit from them. Therefore the cause of stoppages could not be entirely due to the long hydraulic and thick tar. Some gentlemen experienced no benefit from running out the contents of the hydraulic, either wholly or partially, every day. All the answers he received agreed in showing that those who employed the separate system did not work with less seal, although, by frequent flushing and running out, they had a clearer liquid in the hydraulic. Those who had no stopped ascension pipes also had little carbon in the retorts; and this he ascribed to something special in the heats or in the coal. At one works, the hydraulic was divided into partitions by diaphragms between each flange. The contents of any one portion could be run off either wholly or partially; and and there was a gas-way at the top of the diaphragms. This arrangement was not so costly and complex as the separate main system; but it had not the advantage of distinct gas-outlets. The answer to his last question showed that separate sections had chiefly been adopted as a remedy against the unequal sealing that took place in hydraulics of the orthodox fashion. Taking the gas off at several points might be the secret after all in preventing stoppages and reducing carbon deposit, as was suggested by the reply from an engineer of a very large works.

In the course of the discussion, Mr. R. Beynon, of Torquay, said he had had some experience in introducing divided hydraulics; and his reason for doing so was because he found that, in a long length of hydraulic, the seal would vary as much as from 1½ to 4 inches. The result had been a great relief both in the matter of carbon and of stopped pipes. Mr. S. W. Durkin was about to try an experiment as to the advantage of removing the gas from the hydraulic at short intervals, instead of letting it travel to one end. He agreed that long lengths of hydraulic were liable to get out of level: and he always levelled his carefully every year. Mr. W. A. Padfield said he was using both long and short sections of hydraulic, and had found that a separate section for each bed was practically a cure for stopped pipes. It also enabled him to increase the exhaust a little; and the deposit of carbon in the retorts was thus reduced. No doubt the freer the exit for the gas, the better. Mr. Sainsbury agreed that long lengths of hydraulic meant difficulty in regulating the extent of the dip. He now had hydraulics divided off into one section for every three beds, also overflows so arranged that he could take off the tar first. The result was that he could work with more certainty, and could increase the exhaust without risk of drawing air. Mr. Lowe stated that he used separate sections of hydraulics to each bench, but had never realized all the advantages claimed for the system. The greatest advantage in his opinion was the facility afforded for cleaning out or renewing dips. Having been troubled with choked pipes in the top retorts of beds of sixes only, he had found that a simple remedy consisted in lengthening the ascension pipes about 3 feet. Mr. H. G. Crowe, of Wellington, observed that he was sure the separate section system was of great benefit in small works. Before he adopted it, the unequal expansion due to having one part at work and not another had caused a fracture in his hydraulic which might have proved a dangerous accident. He agreed that the separate sections enabled a more delicate regulation of the exhauster to be obtained. The President said he had introduced short hydraulics; but had not secured any decisive advantage. He found that, in a length of hydraulic used for five beds of retorts, the seal would vary to the extent of an inch; and this must be worth obviating. He scarcely knew what a choked ascension-pipe was, but found a considerable amount of tar in the H-pipes. The separate sections meant increased outlay, and there certainly appeared some difference of opinion as to their utility.

Mr. Sainsbury's Paper.

Mr. H. Sainsbury contributed a paper on "Retort Scurfing." He said that no doubt various methods existed for the prevention and removal of carbon from the retorts; and he did not claim to be acquainted with all, and could only speak of those in use at his own works. As to prevention, although the formation of the deposit had been greatly hindered, it could not be entirely obviated. The first method of removal he would notice was the old-fashioned way of leaving the lids slack, and splitting off the carbon with a chisel-edged bar as soon as it was loose enough. This was most ineffective; and he really believed that some retorts used had never been properly cleaned from the time of the first formation of deposit to that of breaking up. Another plan occasionally followed was to build into the front of the retort, roughly, a piece of old wrought-iron pipe, reaching nearly to the back end, and to take the cap off the top of the ascension-pipe, to make it act as a chimney. This process was a very slow one. A plan largely followed, and with success, was to have an air-pipe of (say) 5 inches diameter built into the back of the retort, for admission of air when required for cleaning; but this system needed a free access to the back of the retort stack, which could not always be obtained. The method of working this system was generally well understood. Having discovered in practice that the iron spreaders quickly burnt away, he had used old pieces of fire-tile, and found that they answered equally well, or a few bricks might be used. He always employed this plan where it could be applied, but half of his retorts were close back to back; and therefore other means were necessary for them. Remembering the plan recommended by Mr. S. Rutter, of Uxbridge, at the 1882 meeting of The Gas Institute, he determined to give it a trial. Accordingly, he had an apparatus made exactly to Mr. Rutter's instructions; but, after a little experience, he found it necessary to make a slight alteration in the rose pipe, in order to facilitate the removal of the carbon from the back of the retort. He substituted a plain piece of pipe for the cap with holes; and this soon burnt a hole in the carbon wherever it was placed. This apparatus would clean a retort in six hours, without injury to it. Having a fair amount of boiler power, he could keep two retorts going at one time without interfering with the speed of the engine. A ¾-inch steam-pipe was carried along the principals of the roof just over the retort-beds; and a steam-swivel joint was inserted over the centre of each group of three beds. A length of pipe, and a second swivel joint, enabled any one retort in any of the three beds to be reached. For the 2-inch air-pipe, he used any old pipe that happened to be about, as it would not last out more than four or five retorts.

During the discussion, Mr. W. Davis, of Poole, thought that the apparatus described was a great improvement on any before adopted. For some time he had cleaned his retorts by means of a piece of 3-inch or 4-inch pipe, introduced through a hole in a retort-lid, and extending nearly to the back of the retort; but the pipe was always melting, and only lasted out one retort. He had also tried burning lime in the retorts, while they were off for cleaning, and considered that this plan facilitated the removal of the carbon. Mr. T. W. R. White regretted that the discussion on the two papers they had heard had not been taken together, as the subjects were so closely allied. He thought "prevention was better than cure," and that it was better to diminish the formation of carbon as much as possible, than to think about special means for its removal. One way of doing this, was to attend to the interior surface of the retorts. The deposit formed more rapidly and adhered more closely to a smooth surface than it would to a rough one. He put a coat of liquid cement on the inside of each retort; and this not only hindered the formation, but facilitated the removal of the deposit when formed. At the same time he considered Mr. Sainsbury had described a useful and novel apparatus. Mr. E. C. Riley, of Swindon, said he had a number of small works under his care, where there was no exhauster; and at these the accumulation of carbon was so rapid that the question of its removal was a matter of great importance. Of course, he did not mean to say that there was no carbon at the larger works, where exhausters were used. He had known retorts to be completely destroyed in the course of six months, by the rough application of the scurfing-bar. Having seen the use of high-pressure steam recommended in "King's Treatise," he tried some experiments with it; but they were not successful. The apparatus he employed was similar to that described by Mr. Sainsbury. The injector was carried to within a foot of the back of the retort; and he admitted the steam first under a pressure of 90 lbs., and gradually it increased it to 140 lbs. The result was no better than that which could be secured by slacking the lid a little, taking off the cap on the ascension-pipe, and allowing the retort to stand. He liked the idea of the air-pipe at the back of the retort; but, unfortunately, at many of his works, it was inapplicable, because he could not get access to the back. Mr. Jervis understood that the air was the actual worker in burning off the carbon; and therefore he asked what was the use of introducing steam. Mr. Humphrys said that the removal of the carbon was a simple case of combustion, just like coals or coke burning in a grate. The use of steam increased the draught, and consequently the combustion. But it must be remembered that the specific heat of steam was high. Too much of it would tend to reduce the temperature—perhaps low enough to stop the combustion altogether; and, in his opinion, too much steam was the cause of Mr. Riley's failure. Mr. H. F. Vincent, of Frome, considered the use of steam a deterioration rather than otherwise. He used the back air-pipe, and cleaned his retorts comfortably in twelve to eighteen hours. Mr. Sainsbury having replied, and explained one or two points in connection with his apparatus, the President said that he kept to the old plan of removing the carbon by means of the scurfing-bar; and he regarded the burning off the carbon as a very slow process.

Tar Firing.

It was agreed that a paper by Mr. J. Thomas, of Bodmin, on "Tar Firing," should be taken as read, as the author was not present. He referred to the various difficulties experienced in the practical application of this principle. In order to prevent difficulty in regulating the supply, he placed the supply-tank as near to the furnace as possible, and just a foot above the level of the injector inlet. A piece of ¾ inch compo. tube was a sufficient regulator. A length of 10 inches gave a regular supply of 4 gallons per hour; and if more was required the tube must be shortened, or lengthened to deliver less. A steam-jet injector was used to disperse the tar in the furnace. With this arrangement the heat obtained was so intense that the tar had to be shut off, perhaps for an hour at a time. Then the injector became heated, and

the nozzle stopped up; and to remedy this trouble, he designed a "removable plug" injector, a specimen and photograph of which were exhibited. This arrangement could be removed or replaced in a second. He had used it on a bed of six retorts, producing 35,000 cubic feet of gas per diem for three months, and the consumption of tar was 80 gallons per 24 hours. The flow of tar was stopped for one hour before each charge, or one out of every three. The walls of the furnace, &c., were injured rather more than would be the case with coke. Mr. C. H. Terdrey, of Tavistock, he said, was also using the apparatus very successfully.

CONCLUDING BUSINESS.

Mr. Lowe said that the discussions that day had been good and profitable, and he had great pleasure in proposing a hearty vote of thanks to the readers of the papers. The President seconded the proposition; and it was heartily carried. Mr. Sainsbury replied, and also proposed a vote of thanks to the Directors of the Bridgwater Gas Committee for the use of the Board-room, expressing pleasure at the presence of three of those gentlemen at the meeting. This was seconded, and carried with applause. The proceedings then concluded with a vote of thanks to the President.

At the close of the meeting, the members were hospitably entertained by the President. Tea was served; and a pleasant social hour was spent.

THE MANUFACTURE AND PURIFICATION OF BISULPHIDE OF CARBON.

A practical paper on this subject was read at the last meeting of the Manchester Section of the Society of Chemical Industry by Mr. Ignatius Singer. He remarked that, although the chemical reactions concerned in the manufacture are of the simplest kind—involving only the direct combination of the two elements by passing sulphur vapours over red-hot charcoal in a closed retort, and condensing the bisulphide of carbon which distils over—many technical difficulties are encountered, chiefly on account of the great inflammability and poisonous nature of its vapours. Great care is necessary to prevent all access of air to the apparatus, as bisulphide vapour combined with air or oxygen is not only explosive, but produces carbonic acid and sulphurous acid. Vertical iron or earthenware retorts, about 6 feet high and 22 by 12 inches in internal diameter, capable of making from 4 to 5 cwt. per 24 hours, were used; and at first it was not an easy matter to make all the joints air-tight, as there must be openings for the introduction of sulphur and charcoal (the former every few minutes), for the delivery of the vapours, and for the withdrawal of the ashes. It is necessary that air should be perfectly excluded from the generating retort, as no bisulphide will be formed while oxygen is present, because sulphur had a greater affinity for oxygen than for carbon. Another difficulty was the quantity of uncombined sulphur which distilled over, and tended to choke up the exit-pipes and condensers. Every few days the apparatus had to be opened to remove the accumulated sulphur—an operation not free from danger in the absence of proper arrangements.

The oldest apparatus for the manufacture of bisulphide of carbon on a commercial scale, as used by Peroncel in France 40 years ago, was described, with the aid of an illustration taken from "Richardson and Watts's Technology." The retort, which was 6 feet long by 12 inches in diameter, was capable of producing 2 cwt. per day, and only lasted about a week. This has now been so far improved upon that the productive capacity is doubled, and the retorts will last 60 days or more. Charcoal is now used exclusively as the source of carbon in the retort, having been found to yield better results than coke. Mr. Singer proceeded to point out other defects in this apparatus, which had been remedied in more modern plant; and he made an observation that will be specially interesting to gas engineers. It was that charcoal contains a considerable amount of hydrogen; and when a fresh charge was introduced, no bisulphide would be formed until the whole of the hydrogen had passed off in the form of sulphuretted hydrogen. On this account an oxide purifier is a necessary adjunct at the outlet of the condenser. After a few more historical incidents had been mentioned, the most interesting part of the paper, consisting of a very full description of the best kind of apparatus at present known, was reached. This was illustrated by a large sectional diagram. The sulphur, first melted in a separate vessel, is admitted into the retort in a fluid state, by means of a tube fitted with a plug-valve. The eduction-pipe is large, and inclined upwards away from the retort. Bending at an obtuse angle, it descends into a large vessel, from the outlet of which it has a straight run of about 30 feet. This part is surrounded with a water-jacket, and sloped downwards towards a receiving vessel, from which a pipe leads to the purifiers. The liquid is received into a closed reservoir, and raised to an overhead storeage-tank by means of compressed air. Cleaning-doors are provided at all angles, so as to command the whole length of pipe, for the purpose of clearing out the condensed sulphur; and the condensing vessels are furnished with movable covers, sealed in hydraulic seals. The purifying apparatus consists of a sort of scrubber, supplied with vegetable oil to absorb residual bisulphide, and of an oxide purifier. A smaller retort, set above the main retort, is used for heating up the charge of charcoal. A fresh charge is required every eight hours; and the small retort is so arranged that its contents can readily be "drawn" into the larger one. By this means a charge of fresh charcoal at the proper temperature is secured without loss of time, and without cooling the retort. A cherry-red temperature is found to be the best; and variation either way from this results in a lower yield. The whole apparatus requires to be cleaned out once a week.

The product obtained by the process above described contains a considerable quantity of sulphur, also sulphuretted hydrogen and other sulpho-compounds, which impart to it a pale yellow colour and a disagreeable odour. It cannot be freed from these by simple distillation. There is only one method cheap enough for employment on the large scale, and that is to treat the bisulphide with lime water until the latter flows off perfectly clear, then to pass it into a still, add about 1 per cent. of a cheap colourless oil, cover it with a layer of water an inch deep, to which some sugar of lead may be added, distil in a water-bath, and condense in the usual way. The paper concluded with a list of the numerous commercial uses to which bisulphide of carbon is applied.

THE ILLUMINATING POWER OF DIFFERENT GAS-BURNERS.

At the last Meeting of the Association of Belgian Gas Engineers, M. Busine read a paper giving the result of some photometrical tests he had made at Mons with the various kinds of gas-burners at present in general use. He expressed the opinion that one of the principal causes which tend to assist the competition of other modes of lighting with the gas industry is the injudicious choice of burners or the defective state in which those generally employed are found. It is therefore an important matter to compare these latter from the point of view of their light-giving capacity. The author thought it might be positively asserted that in more than half the cases in which installations of gas had been made in Belgium, gas-burners had been employed which, if replaced by others equally simple, but of improved form, an economy of more than 20 per cent. in the consumption of gas would be effected. This saving could, he considered, be easily extended to 60 per cent., or even more, by using lamps constructed on the regenerative principle. He remarked, in support of this statement, that amongst the open burners there might still be met many of the "Manchester" type, which are entirely adapted for rich gas, and which, with gas of 105 litres, possess an illuminating power of 1·4 carcels for a consumption of 204 litres, being 146 litres per carcel per hour; whereas a slit steatite burner gives, with the same consumption of gas, a light of 1·7 carcels, or 120 litres per carcel per hour. The burner with glass globe mostly used in Belgium is the so-called "American" burner, which M. Busine considers is certainly not the worst form; nevertheless, under the most favourable conditions, it consumes 240 litres of gas in order to give a light of 2·4 carcels (being 100 litres per carcel per hour); whilst there are burners with chimneys which do not consume more than 75 to 85 litres of gas per carcel per hour.

A large number of burners were selected by M. Busine; and, after having tried several of each type, it was found that those given below, which are on the regenerative principle, yielded the maximum illuminating power with the minimum consumption of gas. Their photometrical comparisons are as follows:—

Name of Lamp.	Position.	Illuminating Power in Carcels.	Consumption of Gas per Carcel per Hour.
Fourness	Horizontal	4·00	69·70
Do.	Vertical	6·00	47·00
Wenham No. 2 without reflector	Horizontal	5·43	53·60
Do., do.	Vertical	8·71	33·40
Dalhaise No. 1 without reflector	Horizontal	3·60	55·40
Do., do.	Vertical	5·10	38·00
Dalhaise No. 5 without reflector	Horizontal	5·62	54·20
Do., do.	Vertical	10·77	28·20
"Acme" lamp (small)	Horizontal	3·60	66·60
Do., do.	Vertical	5·12	46·80
"Acme" lamp No. 2	Horizontal	5·71	52·10
Do., do.	Vertical	9·20	32·50
"Cromartie" (small size)	Horizontal	1·61	68·94
Do., do.	Vertical	2·71	42·66

THE Glenboig Union Fire-Clay Company, Limited, have received an award of the First Order of Merit for their manufactures shown at the Melbourne Exhibition.

AT the fortnightly meeting of the Liverpool College Engineering Society on Friday, the 8th inst., an interesting paper was read by Mr. H. Pooley on the "History and Manufacture of Coal Gas." After an historical introduction, an account was given of the chief improvements in gas making introduced up to the present time; the paper concluding with a brief description of a modern works.

THOSE of our readers who are contemplating alterations in the exhauster-house may have their attention usefully directed to the new illustrated catalogue of gas-exhausting machinery which has just been issued by Messrs. W. H. Allen and Co., of the York Street Works, Lambeth, S.E. Exhausters of all kinds—single and combined—especially those of the non-oscillating form, are shown and described, together with the necessary appendages, bye-passes, and the firm's improved parabolic governor. An important branch of Messrs. Allen and Co.'s business is that of pumps and pumping machinery, suitable for tar, ammoniacal liquor, or water, particulars of which will be found in the catalogue.

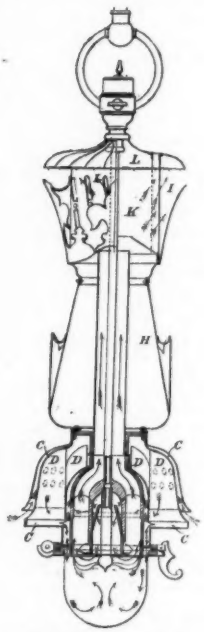
Register of Patents.

COMBINED GAS-ENGINE AND GAS-PRODUCER.—Wilson, A., of Stafford. No. 4944; April 3, 1888. [8d.]

This invention has reference to a combined gas-engine and gas-producer arranged for generating steam under pressure by simple and economical means. The patentee proposes to employ a jet of air or of the exhaust from the engine to inject or suck a current of air, or air and steam or water, or water vapour, so as to form mixtures suitable for gasifying fuel in the generator. The air or the products of combustion for forming the initial jet may be obtained from a receiver or reservoir supplied either direct by, and with a portion of the exhaust gases of the engine, or by means of a pump worked by the engine itself. Instead of using a jet of air or of the products of combustion from the engine to force the current into the producer, for burning the fuel therein, in some cases the patentee proposes to employ a pump to force the whole of the air required mixed with a certain proportion of the exhaust gases, or products of combustion from the engine, or with water or water vapour. Mixtures of air and gases or vapours such as described, whether propelled by a jet arrangement or exclusively by a pump, may in some cases be passed through a regenerator of the kind described in patent No. 1699 of 1882; and water may be put into the regenerator along with the mixture to be heated, so as to produce water vapour or steam, in case there is no other supply of steam available.

INVERTED GAS-LAMPS.—Sugg, D. W., of Westminster. No. 5623; April 16, 1888. [8d.]

The object of this invention is to render any of the well-known forms of regenerative gas-lamps available for out-door use.



In the illustration (one of the inventor's lamps and burners as described in patent No. 2440 of 1887), the body of the lamp is enclosed in a bell-shaped casing C, about twice the diameter of the lamp itself. Inside this casing, and extending across the space between the casing and the body, are secured four, six, or more radial plates or wings D; and in the upper part of the bell casing there are perforations to admit air. Outside the casing is a concentric bell-shaped cover; and across the space between the cover and the case is a ring of perforated metal or wire gauze. The chimney is enclosed in a cylindrical case H surmounted by a cowl I, to prevent the wind blowing down the chimney. This cowl consists of an outer cylinder with suitable openings and a perforated inner cylinder K, the perforations of which are struck from the inside, so as to leave a burr on the outside round each perforation; the whole being surmounted by a close cover L.

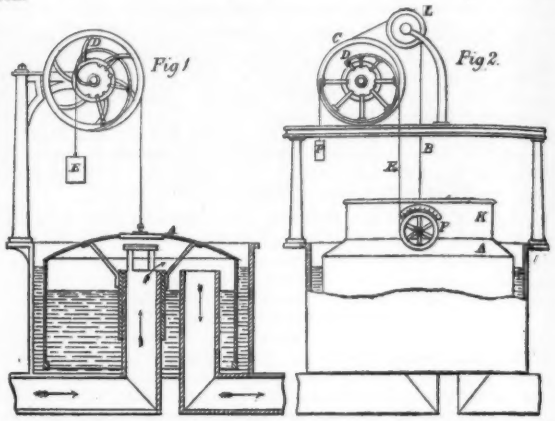
The working of the lamp is as follows:—The wind blows in between the cover and the casing C, where the rush is first broken by the perforated ring. The air then enters the casing; and being prevented by the radial plates D from passing right through, and thus creating a partial vacuum in the globe, is to some extent compressed, and forced down into the globe. The effect of this operation is to supply more air than is actually required—in other words, to over-oxidize the flame, which, instead of being caused to smoke, is thereby slightly reduced in size, or caused to feebly flicker at the edges, without (says the patentee) seriously affecting the intensity of the flame, or the amount of light obtained.

INVERTED GAS-LAMPS.—Schmidt, W., of Dresden. No. 18,060; Dec. 11, 1888. [6d.]

This invention relates to an addition to the ordinary form of regenerative lamp, so as to soften the light emitted, to increase the area of light, and to prevent the radiated heat from being projected in a downward direction, by producing an additional upward current of air. This is effected by using a second shade or globe, formed of ground glass or opal, surrounding the ordinary glass. An opening is provided at the bottom of it for the admission of air, which passes upwards between the two globes, and outwards at the top rim. The sectional form of this additional globe may be that of a portion of an ellipsoid, a portion of a sphere, or of any other suitable shape.

AUTOMATIC STATION GOVERNORS.—Elster, S., of Berlin. No. 562; Jan. 11, 1889. [6d.]

In the engraving, two forms of governors constructed according to this invention are shown—fig. 1, the arrangement used when the governor tank and bell are operated upon by a corresponding weight; and fig. 2, when the loading and unloading of the bell takes place by the admission to or withdrawal of water from a tank fixed on the top of the bell.



The bell A (fig. 1) is suspended by a wire, cord, or ribbon from the periphery of a pulley provided with a spiral D, taking its spring from the centre of the pulley, and bearing a weight E by another cord; so that (according to the motion of the bell) the cord is either wound up or off corresponding to the form of the spiral. As the weight rises, it approaches the centre; and as it falls, it is gradually removed from the centre. This has the effect of more or less balancing the bell by the weight E. The limits of variation between which the change of pressure is made, says the patentee, may be effected by causing the pulley to be a multiple of the greatest lift of the bell, and the spiral to be of a greater measure. If the spiral is turned for a certain arc round the centre of the pulley, it will be seen that the different positions of spiral and pulley effect differences in the limit between which the alterations of weight take place during one lift of the bell; and these limits are so chosen as to be convenient.

The spiral is also used if, instead of a solid body, the loading material is a fluid like water. In this case the bell A (fig. 2) has a cord B leading over the guide-pulley L to the pulley C; this cord being strained by a little weight P. Then (instead of the weight E in fig. 1) the ribbon E is fastened to the spiral D as shown. Upon the bell A is placed the water-load K, the weight of which depends upon the height of the level of the liquid, which is determined by a tube, bent at right angles and moveable round one side of this angle as its horizontal axis—the tube being used as a discharge conduit. The radial part of the angle tube forms a changeable overflow according to its angle with the horizon. This arrangement is connected with the spiral in such a manner that a pulley F on the tube receives at its periphery the cord or ribbon E, and thus causes the variations of the level in K, after being acted upon by the bell A, the cord B, the pulley C, and spiral D, and finally by the ribbon or cord E.

APPLICATIONS FOR LETTERS PATENT.

3472.—LEWIS, J., "Improvements in the arrangement and construction of apparatus for heating air and gas for supplying 'regenerative' gas-burners." Feb. 26.

3525.—PINKNEY, C. W., "Improvements in gas-engines." Feb. 27.

3547.—BROMILOW, J., "Improvements in parts of regenerative gas-furnaces." Feb. 28.

3586.—COLLET, H., and MERICHENSKI, M., "Apparatus for regulating the passage of gas at different pressures." Feb. 28.

3651.—DOWNING, G., "An improved automatic apparatus for igniting illuminating gas." A communication from R. J. Gülcher and M. Bauer. March 1.

3774.—REYNOLDS, T., "Improvements in swivel joints of taps for gas, water, and other fluids." March 4.

3819.—FLETCHER, T., and CLARE, A., "Improvements in and connected with gas-stoves for heating." March 5.

3820.—WILLIAMS, H., "Improvements in gas-engines." March 5.

3821.—WILLIAMS, H., "Improvements in appliances for regulating and controlling the supply of gas and other fluids under pressure." March 5.

3921.—LOEB, L. N., "Improvements in gas-lamps." A communication from F. Schmid. March 6.

3928.—HISTON, A., "Improvements in gas-engines or motors acting by explosive gas." March 6.

3951.—HOLT, H. P., "An improved gas or oil motor engine." March 6.

3972.—ROOTS, J., "Improvements in gas-engines." March 6.

3974.—FLETCHER, W. F., "An improvement in gas-pressure regulators." March 7.

3982.—MOLDENHAUER, C., and LEYBOLD, W., "Improvements in the mechanical revivification of gas-purifying masses." March 7.

4085.—M'GAREL-HOGG, A., and RAFFLES, W. H., "Intensifying and transmitting artificial light." March 8.

4124.—MACTEAR, J., "Improved means of increasing the luminousness of ignited gas." March 8.

4168.—PARLBY, W., "An improved instrument for clearing gas-retort ascension-pipes." March 9.

4197.—WERDENBERG, E., "Improvements in gas cooking-stoves." March 9.

Correspondence.

[*We are not responsible for the opinions expressed by Correspondents.*]

THE DINSMORE GAS PROCESS.

Sir,—Mr. Valon, in his letter of last week, refers to the results obtained by me with the Dinsmore process; therefore I feel called upon to say a few words in reply. The results have been obtained as stated. About that I am perfectly satisfied; otherwise, I should not have taken the responsibility of recommending the extension of the plant at these works.

The anomaly which Mr. Valon points out had presented itself to my mind; and although I have given the matter some attention, I am not yet prepared with a full and satisfactory answer. Whether it is that we procure a great deal more permanent gas from a ton of coal by this process or not, I cannot at present say; but I am sure we get much more than 10,500 cubic feet per ton. It may be also that the previously obtained specific gravities are not absolutely reliable, and that the presence of a quantity of acetylene will account for the increased illuminating power, without giving the additional weight which Mr. Valon states ought to be found. However, I hope soon to settle these things for myself, when I shall be glad to inform your readers of the result. In the meantime, the fact remains that we are still making the quantity and quality stated; and the works are open for the inspection of anyone who likes to see them and test it for himself. It has been objected that gas made from tar would not be permanent, that it would deposit in the street mains and fittings. With reference to this, I may say that for the six months ending Dec. 31 last, 8 per cent. of our total make was Dinsmore gas; and during that period our leakage account was 6·2 per cent., or 2 per cent. less than usual. As we have nearly 40 miles of mains for a comparatively small consumption, it appears to me that the deposition of this gas cannot be more than that of the ordinary, or we should scarcely have been able to get the leakage so low.

Isaac Carr.

Widnes, March 16, 1889.

GASHOLDER CUPS.

Sir,—I gather from the letter of Mr. George Livesey in your last issue that he does not intend to scientifically demonstrate any contradiction of, or to controvert in any way the arguments in regard to the construction of gasholder cups which have appeared in the criticisms in the letters of your correspondents, and in the description of the design of the Sydney gasholder contained in the Journal for Jan. 29 last (p. 198). I take it, therefore, that the cups he prefers, which are made of short bits of boiler plate underlapping and overlapping each other, cannot be, at all events *theoretically*, defended as against the construction of the cups of the before-mentioned design. It also appears to me that Mr. Livesey's statement of the age and durability of the cups of the gasholder in the Old Kent Road amounts to very little, because, upon reflection, he will be aware that he might have quoted gasholder cups by the score of other constructions many years older and in equally good condition. Naturally this resolves itself into a question only of the thickness or substance of the iron used. I likewise think the argument he employs, of the semicircular form of the boiler-plate as forming a more secure attachment for the roller carriages, cannot be maintained, because the attachment depends too much upon the bolts alone, whereas the channel-iron cup not only presents a comparatively broad flat base convenient to place the carriage upon, but also lends itself to taking off a considerable part of the strain from the bolts, by allowing the roller carriage to be constructed to descend vertically at a right angle an inch or so in front. This places the strain direct upon the outer vertical circumference of the channel iron, where it is in the strongest form to resist strains; and thereby the strain upon the bolts is greatly reduced.

I will ask the indulgence of your readers to follow my remarks as closely as possible, as it is naturally very difficult to make these questions clear without the aid of sketches or drawings; and I must also state, in fairness to Mr. Livesey, that, at the time he mentions (1862), long bars of channel iron of the required section for cups were not so practically easily obtainable as they are now. I will take for example a gasholder (say) 150 feet in diameter. The circumference of the boiler-plate cup would be about 470 feet; and it would be formed approximately of 117 pieces of boiler plate, each piece taking up about 4 feet, more or less, in the circumference. Now, how are these 117 pieces constructed? They have each to be bent not only to the semicircle to form a cup, but also bent to the curve of the circumference of the gasholder. It is therefore a double bending. Next, they must each be made of such a shape as to *underlap* the next piece of plate on one side, and to *overlap* the next piece on the other side, to which they are to be riveted; and after being thus shaped, it will be seen that all strains are thrown upon the rivets. They have always been made in this way, and any attempted departure from it only aggravates the amount of workmanship, already excessive. Thus we have the cup before us made up of 117 little bits, and temporarily put together upon the works of the constructor. The erection at the gas-works is also practically both difficult and troublesome, because of its loose and yielding character. It requires blocking and propping all round, at intervals of a few feet, with wood blocks and props, to prevent its springing out of its true circular shape, and to hold it securely together while the process of riveting is being completed; and it frequently happens that, however carefully the work may be done, it will spring out of form after the numerous blocks and props are removed, and necessitate the cutting apart of several, and in some cases many, of the joints, and re-riveting, to bring it into correct form.

Now, briefly referring (for example) to the designs of the Sydney gasholder cups, a totally different state of construction prevails. The cup is there formed of comparatively unyielding channel iron of the required section, heated and curved, in lengths of about 30 feet each. The ends of each bar, after being planed and surfaced to the correct angle, come together, iron to iron, in direct straight line. The total number of pieces forming the cup is reduced to about 16, against the 117 pieces of boiler plate underlapping and overlapping each other as before described.

We have travelled far in iron construction during he 27 years which have elapsed since 1862, when boiler-plate cups were introduced. At that time the cups for telescopic holders were made of two angle irons about 15 or 16 feet long (bars of iron could not in those days be obtained longer than 20 feet without extra cost), and the under side of the cup of the inner lift and the upper side of the cup of the outer lift were formed of pieces of plate iron chiselled out to the curve of the holder. Bar iron in those days was not to be ordinarily got wider than 6 inches; so that it was necessary, for example, to make the bottom plate of (say) an 8-inch cup of plate iron.

When channel bars were introduced for gasholder cups, about 1862, the ironmaster who made them charged £4 per ton over ordinary angle iron; and they were not rolled in longer lengths than 20 feet. But since 1862 grand improvements have been made in the iron manufacture; and now we have magnificent bars of smoothly rolled channel iron of any practical size and width, and 30 to 40 feet in length, at less than the price of boiler-plate iron. And these cups and dips can now be produced, in every way superior, and at 30 per cent. less cost, than the antiquated boiler plate construction.

Rigidity is a prime essential to the lower parts of a gasholder; and neither Mr. Livesey nor any engineer can ever contend that a cup or dip formed of boiler plates, can possess the same rigidity as when formed of modern channel iron, as described, of anything like equality in substance. It is, therefore, an essentially practical question, appealing alike to the judgment of the engineer and to the directors of gas companies who are responsible for the finances.

Engineer and Contractor.

March 14, 1889.

ELECTRIC LIGHTING MATTERS.

Sir,—The short abstract you gave in your last issue of the report of the Committee of the Cheltenham Corporation on the proposed trial of electric lighting evidently proves that the intention of the reporters was to confuse the Council by mixing up street lighting with domestic lighting, and arc lamps with glow lamps. None of the elements of expenditure are given; but they are massed into one sum of £3300 to £3700 a year. The rates of interest or for repayment of capital are not given; neither is the cost for maintenance, depreciation, cost of fuel, labour, superintendence, &c. We can, however, get at two figures. The possible 20 arc lamps are to be supplied to private consumers at £5 each, and the 40 public arc lamps are to cost only £250, or £6 5s. per lamp. What a heap of money must other companies be accumulating who charge £23 or £25 17s. 6d. per lamp; and what a gold mine those contractors must have in future who propose to charge £42 per lamp! The curious thing, though, is this—that the officers of these companies must keep all the profits to themselves, for they do not pay a penny in dividends to their shareholders. It is quite clear that there has been some "juggling" with figures, which I was about to call "dexterous;" but, for the present, I will keep the word "in stock," not to be delivered until I get further information.

In your notice, in the same number, of the Anglo-American Bush Corporation, which I believe is much better managed than some of its competitors, you refer to a profit equal to 5 per cent. on their greatly diminished nominal capital. Now, I have read carefully through the 37 paragraphs of the very able report of this Company; but I cannot find any suggestion as to the payment of a dividend to the shareholders. This is to be regretted, as their manufacturing business ought to be a very profitable one; and I believe they have the services of a very able staff, who ought to earn a good dividend for the shareholders, if their operations are confined to the making of electrical plant, and are not extended into the hazardous region of central station lighting. I am pretty sure that they would not contract to supply 40 large arc lights at a rent of £6 5s. per lamp per year, as the amateur electricians of Cheltenham purpose.

Denny Lane.

Cork, March 14, 1889.

SCURFING RETORTS.

Sir,—Kindly allow me space to briefly describe a method I have devised of scurfing retorts. Procure a number of (say) 3-inch pot pipes, Dry them thoroughly from moisture, and make with them a line of pipe from the mouthpiece to within 4 inches of the far end of the retort; securing the joints of the pipes with fire-clay. Wall up the front of the mouthpiece and around the pot pipe, and take off the cap at the top of the ascension-pipe. The latter then acts as a chimney, and draws air through the line of pipe to the end of the retort, where the carbon is thickest. In two days (however thick the deposit may be) the carbon at the end of the retort will be burnt away, and the rest will be so loose that a sharp bar will fetch it off without damage to the retort.

The above method has the following good points (with me at any rate):—It will clear a retort in one-third of the time it generally takes to burn one clear with a merely slack lid, and a saving in coke is the result. The joint between the mouthpiece and the retort is not so injuriously affected (consequently there is a saving of gas) as with a slack lid. The retort is not damaged to anything like the degree that is usual. I consider my plan superior to steam, for many reasons; one being that it is not all gas-works that are provided with steam. The cost of the pipes will be saved over and over again. To such as have not tried this way of clearing a retort from carbon, I can conscientiously recommend it.

A Country Manager.

March 12, 1889.

The Public Lighting of Leamington.—Having given Messrs. Chamberlain and Hookham twelve months' notice to determine the contract for the lighting of the Parade by electricity, the Leamington Corporation, it will be remembered, decided to return to gas, and obtain some of Sugg's 60-candle power lamps. In order to ascertain at what distances the latter should be placed, the Watch Committee, at a meeting of the Town Council yesterday week, recommended that a portion of Warwick Street should be lighted by them as an experiment. A motion in accordance with the recommendation having been proposed, Mr. Bright, in seconding it, said that the Gas Company undertook to supply gas to a 60-candle power Sugg lamp for £3 14s. 9d.; while the Council were now paying the Company £2 0s. 9d. a year for lighting an ordinary 16-candle gas-lamp. If the experiment proved successful, he hoped it would be extended to other streets. Some of the members desired that Sugg lamps should also be erected in Regent Street and High Street, and an amendment to that effect was moved. It was resolved, however, to restrict the present experiment to Warwick Street.

Parliamentary Intelligence.

HOUSE OF LORDS.

TUESDAY, MARCH 12.

The Examiners reported that the further Standing Orders applicable to the Tuscan Gas Bill and the Barry and Cadoxton Gas and Water Bill have been complied with.

THURSDAY, MARCH 14.

The Burnley Corporation Bill, the Deanhead Commissioners' Bill, the Padiham and Hapton Local Board Bill, and the Wakefield Corporation Bill were referred to a Select Committee, consisting of Earl Belmore (Chairman), the Marquis of Breadalbane, Lord Wimborne, Lord Hamilton of Dalzell, and Lord de Ramsey; to meet on Tuesday, March 19.

FRIDAY, MARCH 15.

The Bristol Water Bill, the Coventry Corporation Water Bill, and the Yeadon Water Bill were referred to a Select Committee, consisting of Earl Strafford (Chairman), the Marquis of Abercorn, Lord De Ros, Lord Poltimore, and Lord Kensington; to meet on Thursday, March 21.

During the past week the following progress was made:—

Bills read a second time: Barry and Cadoxton Gas and Water Bill, Eastbourne Water Bill, Rastrick Water Bill, Tuscan Gas Bill.

Bills committed: Belfast Water Bill, Bristol Water Bill, Bury Corporation Bill, Coventry Corporation Water Bill, Hythe Corporation Bill, Manchester Corporation Bill, Newcastle and Gateshead Water Bill, Newry Improvement Bill, Windermere District Gas and Water Bill, Yeadon Water Bill.

Bill reported: Hythe Corporation Bill.

Petitions against the following Bills were presented last week:—

Belfast Water Bill, from Owners, lessees, and occupiers of property in Carrickfergus and County Antrim, and from Belfast Corporation.

Bristol Water Bill, from the Chilton District Highway Board.

Burnley Corporation Bill, from Padiham and Hapton Local Board.

Bury Corporation Bill, from the Bury Union Rural Sanitary Authority, the Whitefield Local Board, the Ramsbottom Local Board, the Little Lever Local Board, and the Radcliffe Local Board.

Cleveland Water Bill, from the Skelton and Brolton Local Board, and the Local Board of Saltburn-by-the-Sea.

Deanhead Commissioners' Bill, from the Stainland Local Board and the Corporation of Huddersfield.

Newcastle and Gateshead Water Bill, from the Corporation of Gateshead, the Felling Local Board, and the Duke of Northumberland.

Padiham and Hapton Local Board Bill, from the Burnley Corporation.

Wakefield Corporation Bill, from the Owners, &c., of mills, &c., on Booth Dean Clough and the River Ryburn, and the Company of Proprietors of the Calder and Hebble Navigation.

Yeadon Water Bill, from the Baildon Local Board and the Undertakers of the Aire and Calder Navigation.

HOUSE OF COMMONS.

TUESDAY, MARCH 12.

The Examiners reported that Standing Order No. 62 had been complied with in the case of the West Ham Gas Bill.

PRIVATE BILL LEGISLATION.

A Bill for establishing a Commission to examine and report on Private Bills in Parliament, and for other matters relating thereto, was brought in by Mr. Craig-Sellar, Sir J. Mowbray, Sir Lyon Playfair, Mr. J. Morley, Mr. Howarth, and Mr. A. Elliot, read the first time, and ordered for second reading on the 26th inst.

THURSDAY, MARCH 14.

BRIBERY OF PUBLIC BODIES.

A Bill "for the more effectual prevention and punishment of bribery and corruption of and by members, officers, or servants of corporations, councils, boards, commissions, or other public bodies," was brought in by Lord Randolph Churchill, Sir H. James, Sir R. Fowler, Mr. Jennings, and Mr. R. Power, read the first time, and ordered to be read a second time next Thursday.

During the past week, the following Bills were read a second time, and committed:—Faversham Gas Bill, Great Wigston Gas Bill, Kettering Water Bill, Morley Gas Bill.

Legal Intelligence.

MANCHESTER SPRING ASSIZES.—FRIDAY, MARCH 8.

(*Before Mr. Justice* CHARLES.)

SLATER *v.* BURNLEY CORPORATION.—ALLEGED OVERCHARGES FOR WATER.

This was an action by Mr. George Slater, J.P., and Major Slater to recover from the Burnley Corporation £35, alleged overcharges for water. The action was similar to one brought by Messrs. Slater some time ago against the Corporation in the Burnley County Court,* and in which, on an appeal from the decision of the County Court Judge, Justices Cave and Wills decided in favour of the Corporation.†

Mr. BRYNE appeared for the plaintiffs; Mr. SUTTON and Mr. PARRY for the defendants.

Mr. BRYNE said he desired to carry the case farther than was done in the County Court action, so as to distinguish between the two cases, and avoid the decision of the Divisional Court. It was now contended that Mr. R. Watson, Messrs. Slater's agent, had paid the water-rents without knowing that they were based upon annual rental, instead of the rateable value, and that therefore the payments, having been made in mistake of fact, could be recovered. He further maintained that the parties were not upon an equal footing, and that under certain decisions [quoted by the learned Counsel], the payments were not voluntary, and could therefore be recovered on this ground also.

Mr. *Watson*, examined by Mr. BRYNE, said he was not aware that the water-rates were charged according to the rental of the premises.

In cross-examination, witness admitted that he knew the rents of the houses and the amounts of the water-rate, and could have ascertained by calculation that the rates were charged upon the annual rental.

At the conclusion of plaintiffs' case,

Justice CHARLES said there was no distinction between the present case and the former one, and that he would have been bound by the decision of Justices Cave and Wills, even though he disagreed from it. He, however, quite agreed with it; and he accordingly gave judgment for the Corporation with costs.

* See JOURNAL, Vol. LI., p. 922. † *Ibid.*, Vol. LII., p. 30.

Miscellaneous News.

CRYSTAL PALACE DISTRICT GAS COMPANY.

The Half-Yearly General Meeting of this Company was held last Friday, at the Albion Tavern, Aldersgate Street, E.C.—Mr. FREDERIC LANE LINGING in the chair.

The SECRETARY (Mr. Magnus Ohren, Assoc. M. Inst. C.E.) read the notice convening the meeting; and it was agreed to take as read the Directors' report and the statement of accounts for the past half year, a summary of which appeared in the last issue of the JOURNAL (p. 495).

The CHAIRMAN, in moving—"That the report of the Directors and the balance-sheet, examined and signed by the Auditors, be received, adopted, and entered upon the minutes," said the Board met the shareholders under continued favourable circumstances, as would be noticed by the accounts. He thought they might attribute the results of the past half year to the increased prices that had been obtained for residual products—for, in the aggregate, the amount received over the second half of 1887 was about £2800. At the same time the gas-rental had augmented in quite as satisfactory a manner as they could have expected. As an illustration of the progress of the Company, perhaps he might cite the quantity of gas sold during the half year under consideration in comparison with that supplied in the corresponding period of the preceding year. It amounted to 134 million cubic feet, or an increase of about 4 per cent. In reference to the paragraph in the report notifying a further reduction in the price of gas, the shareholders would remember that when he (the Chairman) had the privilege of addressing them in the autumn of last year—when the previous reduction took place—he shadowed forth the probability, in the event of the coal dues ceasing to exist, of another reduction taking place; and it passed through his mind when then speaking that perhaps at midsummer of this year that reduction might be effected. But their prosperity—if he might so express it—was such that they were enabled to announce a reduction as from the close of this month, and that from no extraneous circumstances whatever. By this reduction to 2s. 7d. per 1000 cubic feet, he thought that they were placing themselves as a Suburban Company in a satisfactory position, because at that price they were within a stone's throw of being able to supply gas at 2s. 6d. per 1000 cubic feet. He might mention here that a reduction of 1d. in the price of gas represented a benefit of nearly £3000 a year to the consumers in their district. If the shareholders would carry their memories back two-and-a-half or three years, they would recollect that the reductions had been frequent; so that in the aggregate the amount of benefit to the consumers had been really very considerable. At the same time they had not forgotten that their public contracts also deserved consideration; and the authorities having the control of the public lighting had been benefited in equal proportion. With respect to the accounts (which supported all that he had stated), under the head of coals there had been a decrease of £1352, as compared with the second half of 1887; while the increase in the gas-rental had been £863. In all other respects the working had been equally good. Reverting to residual products, he might mention that, under the head of coke alone, they had an increase of £1924; and in breeze, £82; tar, £704; and sulphate and liquor, £116. In regard to tar, the shareholders were aware that the Board had for some time past thought it advisable in the interest of the Company to consume a certain portion of their production as fuel; and they did this because the price had ruled so extremely low until a very recent period. However, he was happy to say that those days were past, for the present at all events; and the price that could be realized was such that it was quite as remunerative—certainly it made it quite unnecessary for them to continue burning tar as fuel. Regarding coal, the amount carbonized in the six months was 38,112 tons, against 37,766 tons for the corresponding period of the previous year, or an increase of 346 tons. The coal they had been enabled to place in their stores at a reduction of 10d. per ton over the corresponding half of 1887. The amount of gas sold in the six months was 355,013,800 cubic feet, against 341,418,000 cubic feet, or an increase of 13,595,800 cubic feet. They had sold 9315 cubic feet of gas per ton of coal carbonized; and the gas unaccounted for was 5·81 per cent., compared with 7·51 per cent. The capital employed per ton of coal carbonized was in a healthier state than it had been for some years—only amounting to £4 15s. 7d. per ton. Although he did it with extreme reluctance, because he might be charged with claiming for the Company a sort of feeling of doing more for the public than they were called upon to do, and which he repudiated at once, he wished to put their Company in regard to the gas they supplied side by side with the great Metropolitan Companies and other gas companies who carried out a most honourable and liberal policy towards the consumers. By their Act of Parliament, they had to supply gas of 14-candle power; and during the last year it had averaged upwards of 15 candles. The sulphur compounds, or sulphur particularly, must not exceed 20 grains, and the average for the twelve months had been 10·84 grains. These returns were not prepared by their Engineer or any of the Company's officials; but they were from two eminent Gas Analysts—Mr. Charles Heisch, who tested the gas for the Lewisham Board, and Dr. Verdon, who tested the gas for Lambeth. Sometimes they heard remarks about wretched gas, and so he took this opportunity of saying a few words on the subject. He did not claim anything on behalf of the Company; they were simply doing that which other gascompanies were doing in an honourable spirit. In these times gas companies were so attacked that one would think directors, engineers, and secretaries ought to take up their residence at Woolwich—not upon the Common, but upon the hulks. (Laughter.)

Mr. GEORGE LIVESEY formally seconded the motion, which was carried unanimously.

The CHAIRMAN proposed—"That a dividend for the half year ending the 31st of December last be now declared at the following rates per annum—viz., 6 per cent. on the preference stock, 7 per cent. on the ordinary 7 per cent. stock, 10 per cent. on the ordinary 10 per cent. stock, and 7 per cent. on the new ordinary 7 per cent. shares, all less income-tax, and that the warrants for the net amount be forwarded by post on or before the 22nd of March inst. to the registered proprietors on the 31st of December last."

Mr. JAMES GLAISHER, F.R.S., seconded the motion, which was at once agreed to.

On the motion of the CHAIRMAN, seconded by Mr. C. LEA WILSON, J.P., Dr. Frederic Hetley, one of the retiring Directors, was re-elected.

Dr. HETLEY having briefly returned thanks,

The CHAIRMAN proposed, and Dr. HETLEY seconded, a resolution reinstating Mr. Livesey, who also retired, on the Board.

The motion was carried unanimously.

Mr. LIVESEY acknowledged his re-election; assuring the shareholders that he should continue to take as great an interest in the welfare of the Company as in the past.

Mr. A. T. Layton was next re-appointed an Auditor, on the proposition of Mr. W. WESTCOTT, seconded by Mr. ALFRED WILLIAMS.

Mr. R. HESKETH JONES moved—"That the thanks of this meeting be given to the Directors of this Company for their able management of

the affairs of the Company." After the speech that they had heard from the Chairman, he was sure that he need not say anything to commend this resolution to the favourable consideration of the shareholders. He would only endorse what the Chairman had said in reference to the quality of the gas. Being a large consumer in the Company's district, he could conscientiously speak as to the good quality of the gas supplied during the past twelve months.

Mr. G. ENNIS, in seconding the motion, remarked upon the good management by the Directors of the Company's affairs. He desired to point out one way in which the interests of both the Company and the consumers might be promoted. He referred to the abolition of the deposit sytsem. There were not many people who were disposed to pay deposits as security for the gas they consumed. The item stood in the present accounts at £1385; while the dividends paid to the shareholders amounted to about £27,000 a year—that was to say, the shareholders, by the abolition of the deposits, would take the risk of 1s. in the pound, or 5 per cent more than they at present had to bear. He did not think this was a very great risk to take; and he believed it would redound to the advantage of the Company. People objected to pay the deposit; and consequently they used petroleum or other illuminants. The Directors, he thought, should direct their attention to extending the supply of gas to the utmost limits of the household capacity of the district. He did not know what the number of the consumers now was. [The SECRETARY: Above 11,000.] He believed a very small percentage of them paid a deposit; and in five-sixths of the cases where deposits were demanded, they might be abandoned altogether. He considered it extremely bad policy to enforce a deposit; but as far as he could gather, it was enforced very leniently in this Company.

Mr. JONES, in putting the resolution, observed that he somewhat disagreed with the remarks that had been made by Mr. Ennis against the policy of the Directors.

The resolution was cordially passed.

The CHAIRMAN expressed the thanks of himself and colleagues for the compliment which the shareholders had paid them, and said that they should continue to do everything that was possible to promote the interests of the Company. He concluded by moving a vote of thanks to the Auditors and officers for the efficient discharge of their duty.

Mr. LIVESEY said it was his pleasure and privilege to second the resolution. It included the Auditors and officers. They all knew how the Auditors did their duty, and nothing could show it better than the manner in which the accounts were presented. But in the first place they must get the accounts from the officers; and he thought it reflected great credit on the officers—particularly in the secretarial department—that the accounts were always submitted in such a satisfactory form. He was not going to read a lecture to the officers; but he thought he might say one word about this question of deposits. He was rather surprised that so able an accountant as Mr. Ennis should have stated that this £1385 was received in the half year as deposits.

Mr. ENNIS: I did not say that.

Mr. LIVESEY (continuing) said the sum mentioned represented the whole of the amount of deposits held by the Company. He must say that there were cases in which deposits were absolutely necessary. The officers, he was satisfied, were doing their duty most thoroughly in safeguarding the interests of the Company—taking deposits only where it was essential, and refraining in all cases where it was not necessary. Giving all credit to the secretarial department, he thought he must say that a great deal depended upon their Engineer. He had known Mr. Gandon ever since he had been connected with the Company; and he was bound to say that a gentleman more thoroughly fitted for the performance of the responsible duties which devolved upon him could not be found. He was a gentleman who was universally respected; and he (Mr. Livesey) was quite certain the Company was safe in his hands. In speaking of Mr. Gandon and Mr. Ohren, he must include those who served under them; and he was bound to say all the officers of the Company, as far as he had been able to judge, were of the very highest character. So long as they were served by such officers, the shareholders might depend that they would do well.

The motion was unanimously carried.

Mr. C. NEWTON, in a few appropriate words, thanked the proprietors on behalf of himself and co-Auditor and the officers of the Company, for the kind acknowledgment of their services.

The proceedings then terminated.

HASTINGS AND ST. LEONARDS GAS COMPANY.

The Half-Yearly Meeting of this Company was held last Thursday week—Mr. J. BROWN, J.P., in the chair.

It was agreed to take as read the Directors' report for the past half year, an epitome of which was given in the JOURNAL last week (p. 495).

The CHAIRMAN, in submitting the report for adoption, first made a feeling reference to the loss the Board had sustained in the death of one of their colleagues—Mr. E. Hayles, J.P. Proceeding to review the working of the six months, he said that the profits were £9583. Some eighteen months ago, when he first recommended a reduction of 2d. in the price of gas, and an extra ½ per cent. dividend, they found that if everything continued as then they would just be able to meet it. They had met it; and, in addition, they had £2000 more to carry to the undivided profits. But things could not always go on as rosy as this. Their plant became old, and required renewing; and they would have to see to this in the next half year. There were several things connected with the works which would have to be renewed; among them being one of the gasholders. Their No. 1 retort-house had been used for 25 years, and would require seeing to. They had a new set of retorts in the next house; so that next summer they could do away with the present broken-down retorts, and use the new ones while the others were being repaired. All this would come out of the revenue account in the next half year; and they were pledged to the public to take off another 2d. from the price of gas, and also to find a further ½ per cent. for the shareholders. A reduction of 2d. meant £2200 to the Company in twelve months, and the ½ per cent. dividend only came to about £700; so he thought the consumers obtained the best of it. The gasholder he had alluded to was totally worn out in service. It was built 35 years ago. The No. 1 holder was also worn out; and the Directors thought that as the tank of No. 2 would stand, it would be best to put a new holder in No. 2 tank, and have one with three lifts; so that its capacity would be just as much as the large ones—410,000 cubic feet—and then they would have done with gasholders for at least seven years. Their Engineer (Mr. C. E. Botley) kept them well up to the mark in this respect, because he always said they paid for themselves in increased economy in working. They had room enough to build another large holder, which would carry them over a further seven years. Referring to the Gas Examiner appointed by the Corporation, he said that gentleman had been down to Hastings three or four times; and the more he came, the better he had to report. Some of the members of the Council insinuated that the reason the reports were so good was that the Company had altered the system of manufacture, and the gas was better than it used to be. He denied this *in toto*; the statements were either made falsely or in ignorance. He had examined the record of testings for two years—since March, 1887. Three testings were made every day; and the average of the tests up to the time the Inspector was appointed was 15·69 candles. Since then 543 tests had been made, and the average was 15·45 candles; so that before the Inspector came the quality of the gas was 0·24 candle higher than it had been since. In regard to the residual products, the net receipts were £4415 this half year, against £3429; and he thought this was very satisfactory. He concluded by moving that the report and balance-sheet be adopted, and a dividend at the rate of 11½ per cent. per annum on the £25 shares, and at the rate of 8½ per cent. per annum on the £20 shares, be declared.

Mr. W. E. SKINNER seconded the motion, which was carried unanimously.

A vote of thanks to the Chairman concluded the proceedings.

PROVINCIAL GAS COMPANIES.

During the past week the following particulars have come to hand respecting the working of the Companies named:—

The half-yearly meeting of the Brighton and Hove Gas Company was held at the offices, Great Winchester Street, E.C., last Friday week, the Chairman (Mr. F. E. Webb) presiding. The dividends were declared as follows:—10½ per cent. per annum on the original share capital; 7½ per cent. per annum on the "A" ordinary share capital; and 6 per cent. per annum on the "B" (preference) capital, less income-tax.

The accounts of the Dorking Gas Company, which have just been issued, show a balance available for division, after providing for interest on the debenture stock, of £1273; and a dividend of 10 per cent. on the "A" and "B" shares, and of 7 per cent. on the "C" shares is recommended, which will leave a balance of £481 to be carried forward. The manufacturing operations of the Company for the half year ending Dec. 31 last have been satisfactory. The Directors report that the assessment of the Company's premises has been again increased, and they had unsuccessfully appealed against it. The rise in the rates on the higher scale of assessment had caused an expenditure equal to about 1d. per 1000 cubic feet in the cost of gas; thus preventing the Company reducing the price to the consumers.

In the report of the Directors of the Isle of Thanet Gas Company presented to the shareholders last Friday, they stated that, though the price of gas had been reduced from 3s. 3d. to 3s. 1d. per 1000 cubic feet, they had been able, by economical working and the great increase in the value of residuals, to carry to the profit and loss account £3364, out of which they recommended a dividend at the rate of 10 per cent. per annum.

In their report for the past half year, the Directors of the Sheffield United Gaslight Company inform the proprietors that, under the authority given at the meeting of shareholders on Oct. 1 last, the nominal capital of the Company has been increased by £115,572—19,262 of the "D" shares of £5 each then created having been taken up, and the paid-up capital increased by £23,114 by the payment on these shares of a call of 24s. per share. During the half year there has been a satisfactory increase in the consumption of gas, and also in the amount received for residuals. To meet the increased demand for gas, the Company have contracted for the addition of another lift to one of the gasholders at Effingham Street, which is to be ready by next autumn. The works are stated to be in a satisfactory condition. The Directors record their sincere regret at having, since the last meeting, lost the services, by his decease, of Mr. John Hobson, the late Deputy-Chairman, who for upwards of 30 years had been a Director. The vacancy thus caused has been supplied by the election of Mr. R. A. Hadfield. Turning to the accounts, we find that £86,328 were received by the sale of gas; £4423, by meter-rents; and £27,038, by residuals—these, with an amount of £1767 received under miscellaneous heads, making the total revenue £119,557. Deducting from this the expenditure, there remained £41,688 to be carried to profit and loss (net revenue) account; making the total sum at the credit of this account £45,717. The Board recommend the maximum dividends on the various classes of stock and shares, which will absorb £32,443.

The Directors of the Sheppy Gas Company, in the report to be presented to the shareholders at their annual general meeting to-morrow, state that the increased quantity of gas sent out last year did not compensate in rental for the reduction in price made in April; but it was sufficient to afford grounds for anticipating a greater increase in the future. Leakage was considerably reduced, and further economy effected in the working; while the works and plant (under Mr. W. T. Carpenter's direction) were maintained in a condition of thorough efficiency. The accounts accompanying the report show receipts to the amount of £8445; expenditure, £5609—leaving a balance of £2836 to go to the profit and loss account. The sum available for division is £1647, out of which the Directors recommend the full authorized dividend; making, with the interim dividends, 4, 7, and 10 per cent. per annum on the various classes of shares.

The Directors of the Shotley Bridge and Consett District Gas Company have resolved to pay for the past half year a dividend at the rate of 5 per cent. per annum on the consolidated stock, 5 per cent. on the "A" capital, and 3½ per cent. on the "B" capital. The total receipts in the six months amounted to £3378, and the expenditure to £1886—the revenue being £147 more than in the previous corresponding half year.

The Chairman of the Slaithwaite Gas Company (Mr. J. Crowther) had a healthy statement to make to the shareholders regarding the working of the past year at the recent annual meeting. The increase of gas sold during the twelve months was 14 per cent.; and with a view to further stimulating consumption, it was decided to reduce the price of gas from 3s. 9d. to 3s. 4d. per 1000 cubic feet from the 1st prox. The maximum dividend of 10 per cent. was declared.

The annual report of the Directors of the Tynemouth Gas Company has just been issued. It states that the revenue account for the year 1888 shows an improvement, as compared with that of the previous year, of £1158 6s. 6d., arising from an increase in the receipts for gas, and in the income derived from the residual products. The balance of profit on the year's workings amounts to £5147 5s. 6d. In September last an interim dividend for the half year ending June 30 was paid, and the Directors recommend the payment of a further dividend on the second half year of 5 per cent. on the original capital stock, and 3½ per cent. on the new share capital, which will amount to £2359 5s. 1d., and with the payment in September will make the statutory dividend on the year £5718 10s. 2d.; leaving a deficiency on the year's working of £571 4s. 8d.

THE Directors of the Shanghai Water-Works Company, Limited, have declared a dividend of 7 per cent. on last year's working.

THE tender of Messrs. Hocking and Yates, of Strood, for £3000 has been accepted for the new gasholder for the Rochester Gas Company; and the work of construction was commenced last week. The holder is 212 feet in diameter and 35 feet high.

THE STRIKE AT THE HALIFAX GAS-WORKS.

By the telegram from our Halifax Correspondent which appeared in the JOURNAL last week (p. 497), our readers will have learnt that the disaffection which has lately been prevalent among the men employed at the Halifax Gas-Works has culminated in a strike.

On Saturday, the 9th inst., there was a meeting of the Gas Committee; and one or two members, together with the Town Clerk, had an interview with some of the workmen, in order to ascertain more accurately their grievances. Explanations were entered into; and ultimately the Committee were informed that the men could say nothing definitely until evening, when they could consult the night shift. The Committee therefore adjourned until evening. During the day, however, the workmen sent up a statement to the effect that they would only resume their duties on the understanding that the foremen were reinstated, that their wages should be advanced 5s. a week, and that the recently-appointed general foreman (Mr. J. Hoggard) should be dispensed with. At six o'clock the workmen had a meeting; and a deputation, including the foremen of departments, was appointed to see the Gas Committee half an hour later. The former stipulation, except as to the advance in wages, was insisted upon. Various explanations were entered into with a view to coming to an amicable understanding, but this did not seem possible; for while, we believe, the Committee consented that the foremen should return, they declined to give way as regarded Mr. Hoggard. The deputation withdrew, reported to the rest of the workmen, and a second deputation was sent, with no better results. In the meantime matters were becoming critical within the works—all the men having gathered there. Some had had too much drink, and were exceedingly noisy. In the midst of the uproar there was a loud smash, and cries were heard from within he telephone-house. It was found that Mr. Hoggard had been attacked by some of the men, and severely treated, and the two jet photometers were broken. Information was at once sent to the Town Hall, whereupon a body of constables started off to the works to prevent further mischief. Mr. Hoggard was afterwards sent home in a cab. Seeing the condition of some of the workmen, the Committee suggested, and the foremen themselves advocated, that the foremen should resume work, and the matter in dispute stand in abeyance until the following Monday afternoon. Many of the men at first objected; but ultimately they commenced work. Nothing else of an unpleasant nature occurred. The retorts, however, had for some hours been neglected, the result being that the gas supply throughout the town was deficient, and in some parts it had failed altogether.

In accordance with the arrangement above recorded, the men went on with their work until Monday afternoon at three o'clock, when they all (both the day and the night shifts) assembled in the yard of the works, and everything was at a standstill. The Mayor (Alderman Booth) and several members of the Gas Committee met in the office with the Engineer and Manager (Mr. T. Holgate), and attended by the Town Clerk (Mr. Keighley Walton). After a short consultation, the Committee deputed Mr. J. W. Davis and the Town Clerk to have an interview with the men. These gentlemen accordingly proceeded to the spot where the men were congregated, and a short meeting was at once held. Mr. W. Barrett (an *employé* who had been dismissed a few days previously) presided, and, addressing the men, strongly counselled them, whatever was the result of these proceedings, not to use violence, but if it was necessary for them to leave the works, to do so in a quiet, orderly manner, and if the Gas Committee could get someone else to do the work better, to let them do so. He then asked the men to vote upon the following resolution:—"That the foremen and Walter Barrett (the speaker) be reinstated in their former position; and that Mr. Hoggard, the newly-appointed general foreman, be ordered to leave the works." Mr. Davis, before the resolution was voted upon, asked to be allowed to say a few words; and this was assented to very cordially by the men. Mr. Davis then, in a few conciliatory remarks, referred to the understanding arrived at with the foremen on the previous Saturday night, and urged the men not to go back upon that ground of settlement; for by insisting on the dismissal of the new general foreman, they were practically asserting that the Gas Committee must not be allowed to exercise the powers given them by the ratepayers, but that the men employed at the works should be allowed to govern as they pleased. The terms arrived at—that the foremen and Barrett be reinstated—would be accepted by the Committee; but he would tell them plainly, for he wished to be plain with them, that they could not allow Mr. Hoggard to go. The foremen and Barrett agreed to what they thought was a fair compromise. The management were not prepared to sacrifice their position by doing exactly what the men demanded. The Committee would say so far as this—and they had talked the matter over—that if they found after trial that Mr. Hoggard was not the man they expected him to be, they would be prepared to make a change. He sincerely hoped that they would see the subject in a proper light, and go back to their work. The Committee held to this position—that Mr. Hoggard must remain; but they were willing for the foremen and Barrett to be reinstated. The whole dispute was a squabble over which it was not worth while for the men to sacrifice their bread and butter. The resolution was then carried almost unanimously; and Messrs. Barrett and Bennett were deputed to convey the decision to the Committee. Mr. Bennett having read the resolution to the Mayor, the latter replied that the decision of the Committee was that the men should all leave the works at once, and go to the Town Hall for their wages on the following morning. Mr. Bennett said he had begged the men to leave the works quietly. He regretted the result of the dispute; but he did not think it was possible to get the men to accept any compromise, as the notices of the foremen were sent in as a protest against Mr. Hoggard's appointment. Mr. J. Bairstow assured the deputation that there was no disposition on the part of the Committee to get rid of the men. On the other hand, it was the men who wanted to get rid of someone in the Committee's employment. Indeed, it was stated on the previous Saturday by someone that it was the intention of the men to banish both Mr. Holgate and Mr. Hoggard. He wanted to say this—there was no disposition averse to the men. On the other hand, if any of them thought—say, within the next 24 hours—that they were taking a wrong course, and asked to be reinstated, their request would be granted. That was his feeling in the matter. Mr. J. Brook said he would go further than that, and say that if any of the men applied to come back, without having to say they had done wrong, they would be taken back. Mr. Bennett said he had not the impression that the men wanted Mr. Holgate turned away. He certainly did not want it. Mr. Barrett denied that the men required it either. Mr. Bennett then addressed a few words to the Manager, and said he (Mr. Holgate) had appeared to treat him in a shy manner—he would not say with contempt—but he had appeared shy with him; whereas had the Manager shown any disposition to reciprocate a kindly feeling, he would gladly have shown him anything he could with respect to the works. The Mayor then said it would be clearly understood that any of the men who wished to be re-engaged could come and make application. The deputation withdrew, and shortly afterwards the whole of the men quitted the premises in a body, and during the afternoon paraded through some of the principal streets of the town. Subsequently between 30 and 40 men (mostly stokers from other towns) were procured, and escorted, under the protection of the police, to the works, where they were joined by Mr. Hoggard, and operations were resumed, though necessarily under some difficulty.

On the following morning, the disaffected men attended in a body at the Town Hall, and were paid their wages. They afterwards marched in procession to the old Cattle Market, where they held a meeting, and passed a resolution confirming the steps already taken. The Gas Committee met at noon, and, besides arranging for police protection for the Mayor, authorized an application for 50 constables from Bradford, who arrived later in the day. Two or three unpleasant incidents occurred during the afternoon. There were occasional arrivals from other towns to supply the vacancies at the gas-works; and a few of the men thus arriving were accosted, and subjected to rather rough treatment as soon as their errand was discovered. The assaults were due mostly to drink. The first serious public inconvenience from the strike was experienced when the time came for lighting up. There was no supply of gas; and the bellman was sent round just before six o'clock to announce the fact. The street lamps in the western portion of the town were extinguished; and in the centre of the town the lights everywhere, both in the streets and in the houses, were very small. At the railway stations oil-lamps had to be resorted to. At seven o'clock it was stated that the authorities did not expect the supply of gas to hold out longer than nine o'clock. The Mayor attended at the Town Hall for the greater portion of the day; and a strong determination was manifested by the entire body of the Town Council to maintain their ground at all hazards, even should it result in the town having to resort to oil-lamps and candles. They said their resolve was fixed not to depart in the slightest degree from the position they had taken up, and that on no account would the strikers' applications be considered except individually. It was reported that some of the strikers were not unwilling to resume work on the terms of the Corporation, provided they were allowed to return in a body. Although the inconvenience to the district owing to the town being for the most part in darkness was great, very little grumbling was heard; the disadvantages being borne with much good-humour, although, of course, the shopkeepers had the most reason to complain. At ten o'clock in the evening the total number of men at work was 54; the number on strike being about 150. Arrangements were made for supplying the new men with food and sleeping accommodation on the works; and they, in a letter voluntarily written, expressed their satisfaction at the way in which they were being treated by the Committee. The whole of the Bradford policemen on duty were sent to guard the gas-works. The crowd round the entrance gates was large, but miscellaneous; and it included comparatively few of the disaffected men. Some roughs commenced to throw stones, and two policemen were struck. A window in the office was also broken. Seeing this, the police drove the crowd away from the gates. During the evening a number of the street lamps were lit.

On Wednesday morning the men had a meeting at the Central Hall. Mr. Walter Barrett presided, and stated that the foremen had decided to propose to the meeting that they should be reinstated, along with the whole of the men, but that they should concede to the wishes of the Gas Committee to this extent—that Mr. Hoggard should continue to be general yard foreman, without any power at all over the foremen of departments or their men. Practically, he said, this would leave Mr. Hoggard no power. The foremen, while suggesting this, would fall in with any course agreed to by the men. The men then proceeded to debate the question, and there was a manifest indisposition to take the advice offered; the meeting at last resolving, by a large majority, that Mr. Hoggard must be dismissed. The men were exhorted to go on with the contest peacefully; and a resolution was passed unanimously that they should conduct themselves properly, and not molest any new-comers. In the evening the lighting in the centre of the town showed improvement as compared with the previous night; but taking the entire district, there was little change. The arrangements for carrying on the manufacture of gas had, however, improved considerably, and from noon 80 men were at work, about 60 of whom were stokers. Six more arrived in the evening, and 30 additional hands had engaged to come on the following day. Although crowds continued to congregate in the neighbourhood of the works, nothing of a very disorderly nature occurred.

On Thursday morning the number of men who had been engaged at the works was about 100; but in the evening 30 more young fellows arrived from London, and this practically met all requirements. With the addition of this contingent, Mr. Holgate estimated that from Friday the town would have a full supply of gas, and that its quality (which had deteriorated) would gradually improve. The men on strike maintained that they were fighting for a fair thing; and they decided to hold a public meeting of ratepayers, to which the Mayor and the members of the Gas Committee were to be invited. The excitement in the streets had abated, and at night there was hardly anybody to be seen at the entrance to the works, except three or four policemen.

There was little change in the situation on Friday; but, if anything, the lighting was rather worse than on the previous evening, and there was less gas in store. Some dissatisfaction was expressed at this, on the part of the inhabitants, in view of the fact that the number of men installed at the works was nearly equal to that of the men on strike. The latter held a public meeting in the evening, in the Drill Hall, in order to place before the ratepayers their side of the dispute. The first resolution submitted was to the effect that the meeting (which, it should be said, was composed mainly of the humbler classes) disapproved of the action of the Gas Committee in creating the position of Superintendent, which they maintained was unnecessary and expensive to the ratepayers. This was carried with acclamation. The second resolution called upon the Committee to reinstate the foremen and men employed at the works in the positions they occupied prior to the dispute. This was explained by the Chairman (Mr. J. Seed) to mean that Mr. Hoggard was to be dismissed. The wording of the resolution was then altered so as to state this specifically; and in that form it was carried with only two dissentients. The Chairman said that some ratepayers had urged him to allow a resolution to be put to the meeting calling upon the Mayor and the members of the Gas Committee to resign. But the men affected by the strike did not wish this to be done; and, in deference to their wishes, the resolution should not be brought forward. The proceedings, which were throughout in thorough sympathy with the men, then closed.

SANDWICH WATER SUPPLY.—At a meeting of the Sandwich Town Council last Thursday, it was resolved to join with the Eastry Rural Sanitary Authority in promoting a scheme for supplying the districts with water, and to employ an Engineer to report on the project.

REDUCTIONS IN PRICE.—The Directors of the *Cuckfield Gas Company* have reduced the price of gas to 5s. per 1000 cubic feet to private consumers, and to 4s. 9d. per 1000 cubic feet to the Guardians of the Union; both to take effect from the 1st of January last.——The *Broseley Gas Company* have reduced the price of gas 3d. per 1000 cubic feet, as from the commencement of the year.

LEICESTER CORPORATION GAS AND WATER SUPPLY.

Half-Yearly Reports of the Gas and Water Committees.

At the Meeting of the Leicester Town Council on Tuesday last—the Mayor (Alderman E. Wood) in the chair—the half-yearly reports of the Gas and Water Committees were presented.

The Gas Committee reported that the net profit on the working of their department in the six months ending Dec. 31 last was £16,561 17s. 8d. Out of this sum there had been paid £2520, the half-year's instalment of the sinking fund; leaving a balance of £14,041 17s. 8d., which, added to the balance of net profit (£12,361 17s. 8d.) for the six months ending June 30, 1888, made a total of £26,403 15s. 4d. to be applied to the district fund at the close of the current financial year (the 25th inst.), or from which the Council might appropriate or set aside a sum to be applicable for the renewal of the works. The accounts also set out the results of the working of the residual products and the gas-fitting departments of the Corporation. The net amount realized by the former was £7011 7s. 3d. With regard to the gas-fitting business, the half-year's working showed a net profit of £589 4s. 1d. The Committee recommended that a sum of £5000 should be added to the gas-works renewal fund, established in 1884; and that the remainder—£21,403 15s. 4d.—should be placed to the district fund. During the half year reported upon, 45,568 tons of coal were carbonized. The quantity of gas made was 462,658,000 cubic feet, as against 452,080,000 cubic feet in the corresponding half of the previous year; being an increase of 10,578,000 cubic feet, or 2·34 per cent. The Committee reported that considerable progress had been made with the extension of the Aylestone Road works. The two gasholder tanks had been filled with water; and the holder now being placed in one would be ready for next winter's work. The range of building comprising the engine and boiler rooms, and the fitting and other shops, is completed, and ready to receive the machinery.

Mr. S. Lennard, in moving the adoption of the financial part of the report, gave a long explanation of its details. He said the profits for the year ending Dec. 31, 1888, with which the Council would have to deal, amounted to £26,403 15s. 4d.—the largest balance that had been handed over since the gas had been at the present price. The profit for the last half year was £16,561 17s. 8d.; but from this had to be deducted £2520 for the half-year's sinking fund—leaving a balance of £14,041 17s. 8d. The gross expenditure for the six months had been £42,559 5s. 2d.—an increase of £1016 14s. 9d. over that of the corresponding period of the previous year, which, considering the increase of business done, was very small. The total receipts amounted to £70,569 15s. 4d., against £65,433 8s. 8d. for the latter half of 1887—an increase of £5136. The net result was that while the expenditure in the half year reported upon was increased £1016, the revenue had gone up £5136, and the net profit was £14,041 17s. 8d. This sum, with the profit of the previous half year, brought up the grand total to £26,403, against £20,183 in the preceding year, or an increase of £6220. The past twelve months had been as successful as any the Committee had ever had; and although it was his privilege to present the accounts, the work during ten months of the year had been done under the presidency and guidance of the Mayor. With regard to the capital account, they were getting very near to the end of their tether. Only £33,400 remained to be borrowed out of the total amount authorized by Parliament; and they had but £15,281 unspent of that which had been raised. The present section of the extensions at the gas-works would cost £100,000; and the complete extension contemplated would come to £150,000. Out of the £100,000 they had paid nearly £50,000, and had only £48,000 left. This would just complete the present extension; but they had to relay mains, and meet the ordinary capital outlay of the year. They had on the previous day, in Committee, to provide £1500 extra for mains to afford the necessary pressure in one part of the town; and if they did not go to Parliament for additional borrowing powers, they would have to be somewhat sparing, and ask the Council to help them from time to time with the renewal fund. As to the future profits he could not speak hopefully, because they would have to make new coal contracts in the course of a month or two; and there was every prospect of their having to pay a very large increase—£5000 or £6000 at least—for their next year's consumption. Then they would, if possible, adopt the very latest plan of purification; and if they did this, it would involve a large capital outlay and increased cost for working it. This matter had received the careful attention of the Committee and the Engineer (Mr. A. Colson, Assoc. M. Inst. C.E.); but whilst the sulphur compounds in the gas were low in comparison with certain towns, they might be reduced if the Committee adopted the means which some Companies had done. In this case, however, they would inflict upon the inhabitants a greater nuisance than ever before with regard to the residuals. If a new process which had been experimented upon in Belfast was successful, the Committee were resolved not to stand upon the question of a few hundred pounds, but to do the very best they could. He would only add that the Engineer was keeping everything in the highest state of efficiency, and the Committee were perfectly satisfied with the way in which the work of the department was going on.

Mr. Coleman seconded the motion, and it was carried.

Mr. Lennard then moved the adoption of the second part of the report—viz., the recommendation that £5000 be placed to the gas renewal fund. He said the Committee had power to accumulate £20,000 in this fund, which at present stood at only £5000, of which they had plenty of means of disposing. There was a disposition in the Committee to ask for more than the additional £5000; but, in view of the financial requirements of the town, they had only applied for £5000, though they hoped that as the town grew they would receive a larger share of the funds than hitherto.

Alderman Bennett seconded the motion, which was agreed to.

Mr. Lennard, in moving the adoption of the remainder of the report, mentioned that the manufacture of gas for the half year amounted to 462,658,000 cubic feet, as compared with 452,080,000 cubic feet in the corresponding period of the previous year, or an increase of 2·34 per cent.; while the illuminating power stood at 16·76 candles, or 3 candles in excess of the parliamentary standard. The new buildings had been satisfactorily completed; and he believed their works ranked among the most improved and most modern ones in the country.

Mr. Richardson seconded the motion, in order to gain an opportunity of making a few remarks about the sulphur compounds. He did not quite agree with all Mr. Lennard had said on this point; and he hoped the Committee would do all in their power to further improve the quality of the gas, especially in view of there being in the distance the electric light, which had made such tremendous strides during the past few years. The more sulphur they took out of the gas, the greater illuminating power they obtained; and he thought the improvement of the gas was a better way of spending their money than handing over such large sums yearly to the Corporation. The gigantic profits made by the gas undertaking completely demoralized the spending departments of the borough.

Alderman Hart questioned the "demoralizing" effect of the gas profits; pointing out that they only amounted to about 4 per cent. on the capital outlay. There was a feeling in the town that, by the application of these profits to the reduction of rates, the public did not derive as much advantage as they should; seeing that the greater portion of the benefit fell upon the landlords who compounded for their houses. He advocated the expenditure of the profits on permanent public works, as had been done in some other towns.

Mr. Biggs expressed regret that the Committee had not seen their way clear to the total abolition of the meter-rents. It seemed to him unfair to charge that part of the community which consumed the gas for the benefit of those who did not.

Mr. Lennard, in reply, pointed out that the income from this source was £214 lower during the past six months, and would probably be £1000 lower in the present half year. His sympathies had always been in the direction indicated, because he believed that the abolition of the meter-rents would encourage the consumption of gas; but, on the other hand, the time had not come when the price of gas could be further reduced. He hoped the Council would still extend to the Committee their confidence, and allow them to choose the proper time for doing justice all round to the parties interested. Alderman Hart's figures were fallacious, because the profits really amounted to something like 11 per cent. on the capital invested in the concern. When the proper time arrived, the Committee would be prepared with a proposal which, in their opinion, would be just alike to ratepayers and consumers. At present the Corporation had no such powers to erect public buildings as Alderman Hart would like them to exercise, though Manchester and Birmingham had to a large extent; and he doubted whether Parliament would be disposed to grant powers of this kind in future.

The Mayor (replying to a member) explained that the sulphur compounds in the gas manufactured had been reduced from 40 to 25 grains; and he thought their gas undertaking would thus compare very favourably with any other in the kingdom. As to the proposed reduction in the price of gas, it should be remembered that, in addition to their income of £26,000, they were paying off the capital debt, which constituted a charge of about £5000 per annum. He did not think the price of gas would be much lower, because the tendency of increased trade was to raise the cost of coal. The Corporation had reduced the price about £19,000.

The motion was then put and carried.

The Water Committee, in their report, stated that the net profit on the working of their department in the six months ending Dec. 31, 1888, was £57,496. Out of this there had been paid the sum of £1961, the half-year's amount of the sinking fund; leaving a balance of £3788, which, added to the balance of net profit (£3659) for the six months ending June 30, 1888, made a total of £7447, which, now that the reserve fund had again been made up to the maximum amount of £5000 from the revenue, would have to be paid into the district fund, in aid of the general district rate. The quantity of water delivered during the past year was 1,035,896,580 gallons; the average consumption per head of the population supplied being 17·01 gallons. This included the quantity used for trade purposes. The number of houses on the books at the end of December last was 34,548; giving a population of 172,740, which is an increase at the rate of 6·20 per cent. per annum.

Alderman Winterton, in moving the adoption of the financial statement, explained that the profits were slightly in excess of those realized in the same period of the year 1887, notwithstanding the extra expenditure attending the construction of the new works at Oadby.

Mr. Hollingworth seconded the motion, and it was carried.

Alderman Winterton then moved the adoption of the remainder of the report, and mentioned with satisfaction that the reservoirs had been full almost to overflowing during the greater portion of the year, while the lowest point to which they had fallen was only 1¼ or 2 inches below the increased level put up some time ago. They had not had any exceptional rainfall, even in view of the recent severe downpour; while at the same time they had reduced the daily consumption to a fraction beyond 17 gallons per head, which he regarded as extremely satisfactory. It would thus be seen that there was no reason why they should be driven into a panic, as they had nine or ten months' supply already in hand; but still, whenever the proper time came, he would support the Committee in their endeavours to further increase the water supply.

The motion was adopted.

THE ROSS TOWN COMMISSIONERS AND THE GAS-WORKS.

Local Government Board Inquiry.

Last Wednesday, Colonel Ducat held an inquiry at Ross on the subject of the proposal of the Town Commissioners to purchase the gas undertaking of the devisees of the late Mr. James Harris, for which purpose application has been made to the Local Government Board for a Provisional Order, confirming the agreement for the purchase, and granting powers to borrow money. Mr. R. P. Spice, C.E., attended on behalf of the Commissioners; and Mr. Corbet Woodall, C.E., who had valued the property for Messrs. Harris and Co., was also present. Mr. Woodall explained that the opposition offered to the application was more formal than real, as the vendors only required that the Order should state the period within which the arbitration and settlement of the transfer should be made, and also fix the date. Beyond this Messrs. Harris and Co. had no objection to the Order. Mr. Turner (one of the Commissioners) said the suggestion commended itself to their common sense; but there had been no arrangement for a meeting between the valuers. A discussion followed, in which Mr. Spice expressed an opinion that the valuation might be completed in about ten days; but it would not be advisable to limit the valuer to that period. No time should be lost in going into the matter. Mr. Turner assumed that the Order would not be made until the terms of purchase were arrived at. In the course of the subsequent proceedings, the Inspector asked if the devisees of the late Mr. Harris were still supplying gas. Mr. Turner said they were; and for 21 years it was supplied at 5s. per 1000 cubic feet, according to the agreement. In 1882 the late Mr. Harris reduced the price to 4s. 2d.; and last year a reduction to the extent of 5 per cent. for prompt payment was made. Mr. Turner further explained that they took powers to extend the works; but it was not in contemplation at present to erect works if the purchase were completed. He asked if the Commissioners had not embraced the 7th clause of the Gas and Water Works Facilities Act, 1870. The Clerk said they had. Mr. Woodall said the Commissioners had included the Gas-Works Clauses Act, 1871, under which they could not erect new works on land that was not distinctly scheduled. The General Act was prohibitive as regarded the erection of new works. Mr. Turner called attention to a clause in the Ross Improvement Act, 1865, which he maintained was not prohibitive; but even if it was so, it was overruled by a more recent Act. The Inspector asked whether capital would not be required beyond the amount needed for the purchase of the works. Mr. Spice said the capital authorized by the Order should be sufficient to pay for the works, effect improvements, and leave an ample balance to carry on the undertaking. A discussion ensued with regard to probable future expenditure; and the Clerk stated that mains were laid outside the district authorized by the Act, and thought it would be right to include these areas in the Order. Mr. Woodall said the present proprietors should not be parties to cutting off the supply of gas as now carried out. The Order would be unnecessary except for the purpose of increasing the district to be supplied. Mr. Turner suggested

that the scope of the Order should be extended to include the outside districts as a matter of form. If the Commissioners were compelled under the Order to supply every part of the parish where anyone might ask for it, it would be entailing a great expense for a small return. He should object to the parish forming the district, unless there was power to charge according to the outlay and leakage. Mr. Woodall pointed out that the Act provided for this. The Inspector asked how the money was to be raised for the purchase of the works. Mr. Turner said it was to be applied for outside the powers of borrowing under the Local Act. Some evidence having been given in regard to financial matters, from which it appeared that the debts were £4234, and that the Commissioners had power to borrow £8000, the inquiry terminated.

THE OIL LIGHTING AT ERITH.

The Defries Safety Lamp Company do not seem to relish the firmness with which they are being kept within the four corners of their contract for the public lighting of Erith; but they will find their efforts to secure a reduction of the fines nugatory, owing to the general public being from the very first opposed to the change from gas to oil. The following is an extract from a letter recently written by Mr. D. C. Defries to the Clerk of the Board:—"With respect to the fines, the contract is so worded that it, of course, gives you the power to inflict them; but, on the other hand, I beg to draw your very serious attention to the communication we had with respect to this agreement before it was signed, and the reasons for inserting this clause with respect to the fines. It will be within your recollection that you wanted to know what remedy your Board would have in the event of our carrying out our contract in such a manner as to have a large number of lamps out every night. This was answered by the fines clause, which was only to be put into effect in the event of a breakdown. But I put it to you, was it ever intended, in the event of one or two lamps being out of a night, that fines should be inflicted? I most certainly, without hesitation, say 'No.' The clause was not put in to meet such a case, although, as the clause is worded, you are perfectly justified in taking no cognizance of the conversation which led to its being inserted. The mere fact of the penalty being 2s. 6d. for each lamp found out, and our charge for the maintenance of the said lamp being about 1½d., goes to prove my statement; but I hardly think it is fair, when only two or three lamps are out of a night, that we should be fined 2s. 6d., when our charge for keeping them going would only have been 1½d. I should consider it would be fair, in the event of a few lamps being out, that you should debit us with double the amount we charge you; and in the event of a large number being out, as this might be taken as carelessness on our men's part, that the full fines should be inflicted." To this almost pathetic appeal the Clerk has replied that the Board cannot do otherwise than strictly enforce the fines, as they have been led to believe that the system would be so perfected that lamps would not be out at any time; but, instead of this, 98 omissions to keep the lamps going had been reported during three weeks—a state of things which never occurred under the system of gas lighting.

THE PROPOSED ELECTRIC LIGHTING EXPERIMENT IN THE CITY OF LONDON.

The Engineer and Surveyor to the Commissioners of Sewers (Mr. W. Haywood) has presented to that body a report on the projects now before Parliament affecting the City of London. In the course thereof, he alludes to the applications of the London Electric Supply Corporation and the Metropolitan Electric Supply Company, Limited, to the Board of Trade for Provisional Orders to authorize them to light portions of the City. By clause 6 of the Draft Order of the first-named Company, the system of lighting to be employed, as well as the conditions of supply, is to be approved by the Board. By clauses 14 to 16 the undertakers may forthwith, and are, at any time after the expiration of two years from the granting of the Order, to lay down and maintain distributing mains for general supply throughout every street or part of a street within the area, upon a requisition signed by six owners or occupiers of premises along the street, or by the local authority having control of the public lamps in it. By clause 17, the undertakers may serve a counter-notice upon the persons signing the requisition, that unless they take a supply of electricity for three years, of such amount in the aggregate (to be specified by the undertakers in the notice) as will, at the rates charged to ordinary consumers, produce an annual sum of not less than 20 per cent. upon the expense of laying down the required mains, &c., they decline to be bound by the requisition; any difference arising as to the amount specified to be settled by arbitration. It is provided in clause 18, however, that if any requisition is made by the local authority, it is not to be binding unless they tender to the undertakers, within 14 days (if required by them) an agreement binding the authority to take the supply for three years at least for public lighting, in the streets on behalf of which the requisition is made, and to pay an annual sum of not less than 20 per cent. upon the cost of laying down the required distributing mains, &c. By clause 36 a supply of electricity is to be furnished to premises within 25 yards of any distributing main, provided the occupier pays the cost of so much of the main as is upon his property, and of all work that is beyond 30 feet from the main. The occupier is, if required, to enter into a contract to pay for a supply of electricity for three years, at an amount of not less than 20 per cent. upon the outlay. By clause 38 the undertakers are, upon requisition from the local authority, to supply electricity to any public lamps within 50 yards from any main, in such quantities as may be required. If they fail in either their public or private supply, they are to be liable to a penalty of 40s. per day for each default; the aggregate penalty in no case to exceed £50. The price to be charged for public lamps is to be settled by agreement; the private consumption, by meter. Power is given to the local authority to purchase the whole or any part of the undertaking; the value being estimated in the manner directed by the Electric Lighting Act, 1888. The Order applied for by the Metropolitan Electric Supply Company, Limited, is in all respects to conform to the provisions of the Electric Lighting Acts, 1882 and 1888; and, in the main, it is similar to the Order applied for by the other Company. Mr. Haywood concludes his report by remarking that the Commission will probably, according to their custom, oppose these projects, to enable them to gain further information relating to them, and to shape their course of action subsequently as the public interest may necessitate.

MARYBOROUGH (QUEENSLAND) GAS COMPANY.—At the annual general meeting of this Company on the 1st ult., the Directors reported a sum of £1664 available for division; and they recommended that it should be apportioned as follows:—Dividend for the half year ending Dec. 31, 1888, at the rate of 10 per cent. per annum, £1249; reserve fund, £100; retort-benches account, £200; balance to be carried forward, £115. The Engineer and Manager (Mr. J. Henderson) reported upon the additions which have lately been made to the works, and stated that the whole of the plant had been maintained in the highest efficiency.

PROPOSED MUNICIPAL GAS SCHEME AT ST. LOUIS (U.S.A.).

The Municipal Authorities of St. Louis, Missouri, appear, according to our American contemporary *Light, Heat, and Power*, to be anxious to "run" the gas business of that city. The proprietors of the existing gas undertakings have been requested to name the price at which they will be prepared to dispose of their properties on a certain definite basis; but, beyond this, outsiders have been invited to send in offers on the same basis. Under the State Constitution, it seems, the city is precluded from increasing its bonded debt; and therefore the authorities cannot themselves undertake the construction of gas-works at the present time. The city, however, has authority to lease works and to engage in the business of manufacturing and selling gas; but it is considered that to lease the works, or some of them, already established and in operation in the city, would involve the necessity of taking the property at a valuation in excess of its actual worth as property—the excess representing the value of the business or goodwill, which will be absorbed and acquired by the city. Capitalists are therefore invited to erect works which the authorities are to manage, during a term of 30 years, at a rental not exceeding 6 per cent. per annum on the actual cost. At the end of this term, a sum representing the first cost of the works, exclusive of extensions and improvements, is, at the option of the authorities, to be paid to the investors, whereupon the title of the property is to pass to the city. In short, under this scheme, the investment will be a sum representing the cost of the works sunk for the term of 30 years, with interest payable semi-annually, and the principal at the end of the term; all risks attending the business of manufacturing and selling gas being taken by the city. The quantity of gas supplied in St. Louis is about 900 millions annually. The tenderers are to have free use of the streets; but the ground on which the works (which may be constructed for the manufacture of either illuminating or water gas) are located will have to be purchased. Our contemporary considers that an outsider who would put in a bid under such conditions would not have the smallest chance of securing a contract. The whole thing, in fact, seems to be merely an attempt to get some figures wherewith to check the terms put forward by the existing Companies. In other words, an outside bid is sought that may possibly be lower than the prices asked by the Companies; and this bid, which will take into account only the erection of works that shall yield a certain quantity of product, and will not consider the value of the business and goodwill, secured and held by years of application, is to be used to beat down the Companies who have won and held their profitable patronage. The city authorities evidently do not want to enter into competition with the existing undertaking. Control of the present and steadily increasing business, and not competition, is the end aimed at; and to this end, says our contemporary, "gas-works builders and constructive capitalists are invited, at considerable cost of time and trouble to themselves, to become cat's-paws for the estimable Municipal Authorities of the old city." The bids were to be opened on the 5th inst.; and it will be interesting to learn how many were sent in. The entire scheme is thought to be only a political sensation, stirred up with some occult motive by people who have all to gain and nothing to lose by it.

METROPOLIS WATER SUPPLY.

The returns furnished to the Registrar-General by the London Water Companies show that the average quantity of water supplied daily to the Metropolis during the past month was 156,558,624 gallons, against 154,025,254 gallons in the corresponding month of 1888. The number of houses served last month was 747,598, or 209 gallons per house, and 26·8 gallons per head of the population. In February, 1888, the number of houses supplied was 734,383; and the quantity of water allowed for each person 26·9 gallons. Of the entire bulk of water supplied last month, 77,231,638 gallons were drawn from the Thames, and 79,326,986 gallons from the Lea and other sources.

In his report to the Registrar-General on the quality of the Metropolitan Water Supply last month, Dr. E. Frankland remarks:—"Taking the average amount of organic impurity contained in a given volume of the Kent Company's water during the nine years ending December, 1876, as unity, the proportional amount contained in an equal volume of water supplied by each of the Metropolitan Water Companies and by the Tottenham Local Board of Health was: Kent and Tottenham, 0·5; Colne Valley, 1·2; New River, 2·0; Grand Junction, 2·1; Southwark, 2·4; Lambeth, 2·7; East London, 3·0; West Middlesex, 3·1; and Chelsea, 4·0. The Thames water sent out by the Chelsea, West Middlesex, Southwark, Grand Junction, and Lambeth Companies was of much better quality than that delivered during the two preceding months. It was, in every case, efficiently filtered. The Grand Junction Company attained the highest degree of organic purity; whilst the Chelsea Company was considerably behind the other Thames Companies in this respect. The water chiefly derived from the River Lea, and delivered by the New River and East London Companies, was of about the same quality as that of the best Thames-derived waters; the New River Company's water taking, as usual, the highest place in regard to organic purity. Both samples were clear and bright; but the East London Company's water was unusually hard. The deep-well waters of the Kent and Colne Valley Companies and of the Tottenham Local Board of Health were, as usual, of a very high degree of organic purity; and the Colne Valley Company's water, having been softened before delivery, was also of good quality for laundry use."

STOCKTON AND MIDDLESBROUGH CORPORATIONS' WATER SUPPLY.

The annual report of the Stockton and Middlesbrough Water Board on the supply in the past year has lately been issued. We learn therefrom that during the twelve months ending in December, 1888, the quantity of water pumped was 3,091,052,000 gallons, as compared with 3,157,736,000 gallons in the previous year; being a decrease of 66,684,000 gallons. Some part of this decrease is accounted for by the fact that pumping for 53 weeks is included in the return for 1887, and for only 52 weeks in 1888. There is, however, a trifling decrease reported in the weekly average of pumping; the quantities for the two years having been as follows:—1887, 59,580,000 gallons; 1888, 59,443,000 gallons—decrease, 137,000 gallons. This does not really represent a smaller quantity of water taken from the Tees, but is merely produced by a partial correction of the data upon which the work of the pumps has been heretofore calculated. The parliamentary limit was not exceeded during the year. Previous to 1878, when the works were acquired, the largest weekly average was in 1875, when it was 53,358,000 gallons. The quantity of water supplied by meter last year was: Stockton, 666,231,000 gallons; Middlesbrough, 1,524,992,000 gallons—together, 2,191,223,000 gallons. Adding the domestic supply, 889,026,000 gallons, the total of 3,080,249,000 gallons is produced. There were in store at the end of the year 20,062,000 gallons of water, against 9,259,000 gallons at the close of 1887. The average weekly quantity of water supplied by meter was 42,139,000 gallons, against 39,113,000 gallons in 1887; being an increase of 3,026,000 gallons. In 1878 the average was 28,251,000 gallons. The largest quantity of water supplied by meter in one week (that ending Aug. 18) last year was 45,426,000 gallons. The total number of consumers by meter was 349, of whom 175 were in the Stockton, and 174 in the

Middlesbrough district; the number of meters in use being 591. The average quantity of water used weekly for domestic purposes during the year was 17,097,000 gallons, against 20,486,000 gallons in 1887; being a decrease of 3,389,000 gallons. This quantity includes all water wasted or lost by leakage, as well as that used for buildings, horses, gardens, and trade purposes not supplied by meter. As the population served is certainly not less than 170,000, the consumption per head per day is rather less than 15 gallons.

BRISTOL WATER COMPANY.

According to the report of the Directors of this Company which will be presented at the annual general meeting next Saturday, the rental for the past year amounted to £81,514, being an increase of £1224 over that of the previous twelve months. The sum shown by the revenue account to be applicable for distribution is £19,642, and the Directors recommend a dividend of 4¾ per cent. on the ordinary £25, £20, £6, and £4 10s. shares; making with the intermediate dividend of 4¼ per cent., a total of 8½ per cent., and leaving £772 to be carried forward. The capital expended during the year was £114,822. Considerable progress has been made in the construction of the new reservoir and filter-beds at Barrow Gurney, and the other new works of the Company; and the Engineer (Mr. H. W. Pearson, M. Inst. C.E.) reports that the whole of the Company's works are in good condition. The Company's Bill, which was in Parliament at the date of the last annual meeting, received the Royal Assent on Aug. 9, 1888. By that Act the Company obtained power to take water of excellent quality from the Rickford and Langford Springs, two tributaries of the River Yeo; but they were prohibited from pumping underground water —a restriction which considerably limited the extent of the supply of water sought to be obtained under the Act. The Directors have promoted this session a Bill to supplement the powers already granted; and this step has received the approval of the shareholders. Under the scheme it is proposed to make a reservoir of large capacity on the River Yeo, as suggested by the inhabitants of the district during the passage of the Bill last session. From this reservoir the water will be pumped into the Company's existing aqueduct on the Mendip Hills. Petitions have been deposited against this measure; but no serious opposition is expected.

DUNDALK WATER SUPPLY.

Last Tuesday, Mr. C. P. Cotton, C.E., Local Government Board Inspector, attended at the Dundalk Town Hall for the purpose of taking evidence as to the merits of an application received from the Town Commissioners for a further loan of £4000, in connection with the new water-works scheme. After four failures to supply the town with water, under pressure (two being by private Companies and two by the Commissioners), the latter body finally adopted a plan propounded by Mr. R. Hassard, C.E., the total cost of which was not to exceed £24,000; but by way of precaution a few thousands more were borrowed from the Board of Works—making £26,000. This being found insufficient, a further sum of £5000 was obtained; and even this not being adequate to meet all liabilities, a new loan of £4000 was applied for a short time ago. It was for the purpose of ascertaining whether this money was required that the Inspector was holding the inquiry. Mr. W. R. Rogers (solicitor) attended as a ratepayer to oppose the loan. He objected that the estimate for the works had been exceeded by £1000 and upwards; that the lighting, draining, and cleansing of the town were being neglected; that a large portion of the rates had been expended in frivolous and vexatious opposition to an Act of Parliament promoted by the Dundalk Gas Company; and that money was uselessly spent in electric lighting, which had proved to be a complete failure; and that the rates were not being applied for the purposes contemplated by the Towns Improvement Act. The only witness examined on behalf of the Commissioners was the Town Clerk. He deposed to the construction of the water-works, and to the resulting splendid supply of water. The amount of the contract was £22,990, and the contractor had been paid £21,233; the balance being held by the Commissioners. There remained liabilities to be met of about £3111; and the contractor had claims for extra work to a large amount, which were not admitted by the Commissioners. The Inspector intimated to Mr. Rogers that the scope of the inquiry did not permit him to go into the objections he had put forward; his duty being merely to ascertain the necessity for a further loan to complete the works. He would, however, report the matter to the Local Government Board. The inquiry then terminated.

Suicide with Gas.—Mrs. M'Auley, of Chicago, who, through jealousy, shot her husband in December last, recently deliberately destroyed herself by inhaling gas. She was found dead in bed, with a rubber tube connected with the gas-jet (which was turned full on) in her mouth.

Proposed Electric Light Company for Keswick.—On Friday, the 8th inst., a private meeting, convened by circular, was held at the Court Buildings, Keswick, to consider the advisability of establishing a company for the supply of electricity for lighting and other purposes. Mr. Reginald Marshall occupied the chair. Mr. J. Fawcus, C.E., explained at some length a scheme he had prepared for supplying the town with the electric light; the motive power to be derived mainly from the River Greta, by means of a turbine. In dealing with the commercial part of the question, he contended that, if the Company was adequately supported, it would be possible for them to supply the electric light at a lower price than Keswick gas, and at the same time pay a good dividend. It was agreed that the establishment of a company was desirable; and it was decided to take steps to ascertain the amount of support the undertaking would be likely to receive.

The Brierley Hill Local Board and the Gas-Works.—Some time ago, a question as to the desirability of purchasing the Brierley Hill Gas-Works was raised at the Local Board; and a deputation was appointed to wait on the Directors of the Gas Company in regard to the matter. The meeting took place on Monday last week, when the deputation were informed that the Directors had no authority to sell without consulting the shareholders. The deputation then asked whether the Directors would state the terms of sale; in reply to which they were informed that the Directors were unable and unwilling to do so. The deputation wished to know whether the Company would dispose of the works on the terms on which the Birmingham Gas-Works were transferred. The reply to this was that possibly they might; but they pointed out that this purchase was based on perpetual bonds to the amount of the dividends to each shareholder, and a bonus of £50,000 for the goodwill. But it was for the Local Board themselves to propose terms of purchase in writing for the consideration of the Directors; and should these be such as to justify the Board in bringing the matter before the shareholders, they would do so. The Directors gave the deputation to understand that any terms submitted must be on a very liberal basis to be entertained at all; and the various understandings must be such as those agreed to in cases in which gas undertakings had been acquired by corporations and other public bodies. The deputation expressed their intention of framing a scheme on this basis to put before the Directors for their consideration, and then withdrew.

NOTES FROM SCOTLAND.

(from our Edinburgh correspondent.)

Edinburgh, *Saturday.*

There is a Scotch proverb which speaks in non-complimentary terms of the bird that "files its own nest;" and I am afraid I must apply the sentiment to Mr. Kinloch Anderson, of Edinburgh, for his remarks at the meeting of the Edinburgh and Leith Gas Commissioners on Wednesday; while Bailie Turnbull, the Chairman, is also not free from the same taint. Reports for the month of February by Mr. R. Mitchell, the Engineer of the Edinburgh works, and Mr. F. T. Linton, the Engineer of the Leith works, were submitted. Taking the Edinburgh report first, the amount of gas made last month was 88,869,000 cubic feet, as against 91,380,000 feet in February last year; the carbonizing wages were £2062, against £2257; the coal carbonized was 9008 tons, against 9394 tons; the cost of coal was £5153, against £6723; and the average number of retorts working was 408 against 418. The figures relating to the Leith works were as follows:—The quantity of gas made last month was 38,968,000 cubic feet, as compared with 40,649,000 feet in February last year; carbonizing wages, £976, compared with £870; coal carbonized, 4189 tons, compared with 4212 tons; cost of coal, £2163, compared with £2460; and the average number of retorts working was 161, compared with 144. The Chairman, on the presentation of the reports, remarked that, on comparing the gas made during the two years, he found that a larger quantity was produced in 1888 than in 1889; but the cost was going to be considerably more this year. Wages were a little higher; and this might account for some small part of it. In Leith the coal carbonized was only 23 tons less than last year. This brought up Mr. Kinloch Anderson, who made the extraordinary statement that the output at the Leith works during February was less by 1,681,000 cubic feet than last year, although the retorts numbered 161, as against 144 last year. Each ton of coal in 1888 produced at Leith 9650 cubic feet; and this year only 9302 feet, or a decrease of 348 cubic feet, with 17 more retorts at work. At the Edinburgh works last year, each ton of coal produced 9727 cubic feet of gas, as compared with 9865 feet this year; being an increase of 138 feet, with 10 retorts less. It was understood that the Leith retorts were superior to those at Edinburgh; yet they produced 563 feet less gas per ton of coal. After a little deliberation, the Commissioners sent the matter to the Works Committee to obtain explanations from the Engineers. It may be that the Commissioners did not show at their best on account of their most intelligent members being in London engaged on parliamentary business; but assuredly it is not the interest of any of their number to start such stupid subjects in open meeting, when explanations might be obtained in private that would entirely dispel the fancied shortcomings of their staff. But besides being a foolish proceeding for any Commissioner to endeavour to damage the business he is appointed, and has undertaken to promote, it is not gentlemanly, in respect of its unfairness to the Engineers, to raise the question in their absence. Two minutes' explanation in private would have sufficed to put the matter right; and then, if it was felt to be necessary to give the public some explanation of the figures, the Chairman could have given it in a straightforward manner, and not have brought the question forward, as he did, in a way which leaves a bad taste in the mouth. The figures are easily explained. In the first place, the Chairman surely knows that last year was leap year, when there is an additional day in the month of February. Had he added one twenty-eighth to the output, he would have found that in February of last year it was 132,029,000; and this year, for 29 days, it would have been 132,402,607, or an increase of 373,607 cubic feet—not a great deal, to be sure, but still quite satisfactory when the clear weather of February last is taken into account. Mr. Anderson went upon the quantity of gas produced per ton of coal. Every gas engineer must laugh in his sleeve at the notion of judging the efficiency of a gas-works upon this single datum. The cost of coal is the principal factor, and cannot be left out of account. If he had taken the figures before him, he would have found that, whereas in Edinburgh last year 9865 cubic feet were produced from coal which cost 14s. 3½d. per ton, this year the yield was 9727 cubic feet from coal which cost 11s. 5½d. per ton; and that in Leith, while last year there was a yield of 9650 cubic feet from coal costing 11s. 8d. per ton, this year 9302 cubic feet were derived from coal which cost 10s. 3½d. per ton. That is to say that last year, in Edinburgh, the coal carbonized during February was 2s. 7½d. per ton dearer than the coal carbonized in Leith, and yielded 215 cubic feet more than the Leith coal; and that this year, using coal in Edinburgh 1s. 1½d. per ton dearer than in Leith, the yield per ton is 425 cubic feet per ton more in Edinburgh than in Leith. All this goes to show, not a falling off in Leith, but that Mr. Mitchell's improved retorts in the Edinburgh works are effecting a great saving to the Commissioners. But whatever the figures may prove, the incident is an illustration of the danger of possessing a little knowledge, because, had Mr. Anderson known less on the subject, he would have held his tongue lest he should commit himself to a blunder; and had he known more, he would equally have kept silent, knowing that there was really nothing to speak about.

For some reason which neither I nor anyone to whom I have referred can explain, the Edinburgh gas annuities have fallen considerably in price within the last two weeks. They are quoted at so much per £1 annuity. Three weeks ago the price was £29 12s.; it then fell to £29 10s. 6d.; was £29 6s. 3d. a week ago; and yesterday was £29 2s. 6d. It is thought by some that the general improvement in trade is drawing money off to other enterprises equally profitable—thereby reducing the value of municipal stocks at home. Others look to the failure of the Oregonian Railway Company, the losses in connection with which, they think, may have obliged some holders of gas stock to part with it. Others, again, think the fall is natural—that as much stock as could be obtained was secured by speculators during the time of the transfer negotiations, in the expectation of its rising after the acquisition of the works by the Corporations, and that these having now cleared out, the stock is finding its proper market level. Probably the real cause of the decline will be found to lie between this and the first reason.

The Lighting Commissioners of Berwick, though put under pressure by a pushing agent of an electric lighting company, have declined, on account of the extra cost, to recommend that the streets of the town should be lighted by means of electricity.

(from our Glasgow correspondent.)

Glasgow, *Saturday.*

During February the make of gas at the three works belonging to the Glasgow Corporation Gas Commissioners amounted to 295,978,000 cubic feet, the average illuminating power of which was practically 23 standard candles, or rather more than 23 candles, according to the report of Mr. Tatlock, the Gas Examiner for the city. In the corresponding month of last year, the make of gas amounted to 295,036,000 feet; so that the increase this year was, apparently, not more than 942,000 feet. But it has to be remembered that 1888 was a leap year, whereas February of this year was only a 28-day month; so that the monthly increase may confidently

be put down at 16,000,000 cubic feet. The average yield of gas per ton of coal carbonized was a little above 9600 feet.

At a meeting of the Johnstone Gas Commissioners last Monday, the following report by the Gas Manager (Mr. R. L. Dean) on the condition of the gas-works and their powers of supply was submitted, but its full consideration was allowed to lie over till the next meeting, so that the Commissioners might get time to mature their views on the subject:—"For three months ended the 31st of January, 1888, the quantity of gas made was 10,283,100 cubic feet; being an increase of 1,188,700 cubic feet compared with same period of last year, or fully 13 per cent. The greatest quantity of gas made per day was 154,600 cubic feet; being the greatest quantity ever produced in one day at these works, our retorts being all in full operation. The greatest quantity sent out in one day was 170,000 cubic feet. The nominal capacity of the gasholders is equal to 76,000 cubic feet. The recognized rule is capacity equal to maximum daily make; and, for retorts, about one-third more than the greatest number in use in midwinter. I have also to state that during the present winter the town has been within a minute or two of being plunged in darkness from want of supply. From the foregoing statement, you will easily see that our position this winter has been a very trying and an anxious one; and with public works and tenements in course of erection, and other extensions in prospect in the burgh, I cannot too strongly urge on you the advisability of giving your earliest consideration to the extension of our carbonizing and gasholder accommodation. The exhauster is too small, and would require to be replaced by a larger one. The station meter is also too small, and cannot measure the quantity of gas passed through it, and would require to be replaced by a larger one. Our coal storeage is also short of our requirements, which compels us to use a great quantity of wet coals, which occasions considerable loss. We have storeage only for 200 tons, but require accommodation for 500 tons. I believe the saving effected would cover the cost of building." It is estimated that the improvements and extensions that Mr. Dean hints at would involve an expenditure of something like £4000—possibly more. So far as an opinion can at present be formed in reference to this matter, it seems likely that the extension scheme will excite some opposition amongst the townspeople, who regard an outlay of £4000 on the gas-works as a very serious matter. On the other hand, it is considered likely that the Commissioners will generally admit that something must be done, so as to keep the gas-supplying powers in advance of the immediate demands of the town.

Yesterday in the Glasgow markets the price of sulphate of ammonia advanced 7s. 6d. per ton—from £11 15s. to £12 2s. 6d. per ton f.o.b. at Leith. The demand was reported to be more active than it has been for a considerable time past.

The Glasgow pig iron market has presented great firmness this week; and the price for cash transactions has been as high as 44s. 3d. for Scotch iron, or 9d. per ton above the highest, and 4s. 2d. per ton above the lowest, figures recorded during last year. In the preceding year, however, up to 47s. 4d. per ton cash was paid. During the past few days, a large quantity of Scotch iron has been brought for shipment to Germany—a somewhat unusual circumstance; and the inquiries indicate that more orders will yet be placed. Canada is also buying Scotch iron; several orders having been placed within the past day or two. Local consumers are buying with uncommon freedom, and the evidences are for greater activity. The makers of Scotch special brands are firm in price. There are now 82 blast-furnaces in operation, compared with 85 this time last year.

A considerable amount of activity is still evident in the local coal trade; but there has been no advance in prices recently to warrant any further rise of wages for the colliers.

CURRENT SALES OF GAS PRODUCTS.

LIVERPOOL, *March* 16.

Sulphate of Ammonia.—As in the weather, so there is in this market an agreeable change for the better; and quotations have been raised all round. But what is more satisfactory still, buyers can be found at the enhanced values. It will be remembered that, owing to the constant buying of the speculators, stocks have not accumulated largely anywhere; and now that the consumptive demand is making itself more felt, the fact of the by no means ample supplies becomes more and more apparent. The bright weather is rapidly reducing the output of liquor; and it is probable that not much sulphate will come on the market during the next few weeks. The shipments meanwhile continue on a large scale; and the result of those from Scotland is that there is very little at present available for home consumption, and it may be expected that prices during the season will be dearer there than elsewhere. It is reported that £12 is now being refused both at Leith and Hull; while some business is still being done at Liverpool at about this figure. Nitrate remains steady.

LONDON, *March* 16.

Tar Products.—There is a better feeling in the anthracene market; and it is reported that large sales have been made during the week, especially of "B" qualities or Midland makes. Large stocks are reported to have changed hands at prices varying from 1s. to 1s. 2d. per unit. Benzole is continuing weak; and is somewhat unsaleable. Lower prices are being taken, and yet lower being bid, for forward delivery. Other products are in fairly good request at former rates. Prices: Tar, 18s. to 23s. per ton. Benzol, 90 per cent., 2s. 9d. per gallon; 50/90 per cent., 2s. 2d. per gallon. Toluol, 1s. 5d. per gallon. Solvent naphtha, 1s. 3d. per gallon. Crude naphtha (30 per cent.), 1s. per gallon. Light oil, 3d. per gallon. Creosote, 2d. per gallon. Pitch, 20s. to 23s. per ton, according to position. Carbolic acid (crude), 3s. 10d. per gallon. Cresylic acid, 10d. per gallon. Tar salts, 17s. per ton. Anthracene (30 per cent.), "A" quality, 1s. 3d. per unit; "B," 1s. to 1s. 2d. per unit, according to quality.

Ammonia Products.—After some considerable depression, sulphate has again "picked up;" and to-day it is undoubtedly better than it was a few days ago. Notwithstanding gloomy accounts about foreign markets for this article, shipments are large, and enquiries for forward business are perhaps as great as they were this time last year. The home consumption of sulphate is somewhat disappointing; but this may be due to the bad weather that has obtained during the past month. Prices have ranged from £11 10s. to £11 17s. 6d. per ton. Prices for other products are as follows:—Gas liquor (5° Twaddel), 8s. per ton, with a rise or fall of 1s. 6d. per degree. Liquor ammonia, 2d. per lb. Carbonate of ammonia, from 3d. to 4d. per lb. Muriate of ammonia, brown, £19 per ton; white, £25 per ton. Sal-ammoniac, £30 to £33 per ton.

GAS CONSUMPTION AT MIDDLESBROUGH.—At the Middlesbrough Corporation Gas-Works the quantity of gas made this year shows, as far as reported, an advance of about 10 per cent. on the quantity produced in the corresponding period of 1888.

WATER SUPPLY AND DRAINAGE WORKS FOR LEIGHTON BUZZARD.—The Rural Sanitary Authority of Leighton Buzzard have instructed Mr. J. C. Melliss, C.E., to prepare a scheme of water supply, drainage, and sewage disposal for the town.

NORTHERN COAL TRADE.—There is less activity in the coal trade of the North; and as there has been much more coal in the market, owing to a strike at the blast-furnaces of Cumberland, prices have been weaker. Steam coal is the steadiest, and as the shipments are likely to increase soon, prices are tolerably firm. Gas coal is more abundant; and though 8s., less 2½ per cent., is the price generally asked, it is believed that lower rates are taken. Some Continental contracts of moment are now in the market. Household coal is very dull, and lower in price; but there is a fair demand for manufacturing coal at good figures.

SALES OF SHARES.—Last Wednesday week, 20 ordinary shares of £25 each in the *Staines and Egham Gas Company* were sold by auction at Staines at prices ranging from £55 to £56 10s. per share.——The same day some shares in the *Chertsey Gas Company* were sold by auction, and the following prices realized:—Original £5 shares, £11 12s. 6d. each; "A" shares (30s.), £3 10s. each; "B" shares (£2 10s.), £6 12s. 6d. each.——Last Thursday, a number of *Bolton Corporation* gas annuities (perpetual) of £1 13s. each, belonging to the late Alderman Moscrop, J.P., who for so many years was identified with the gas undertaking in Bolton, were offered for sale, and realized up to £50 10s. each, which is the highest price hitherto obtained for such annuities. Several lots of consolidated "A" stock of the *Farnworth and Kearsley Gas Company*, belonging to the same gentleman, were sold at prices ranging up to a premium of £117 10s. per £100; several lots of this stock being sold for about £160 per £100.

THE PROPOSED TRIAL OF ELECTRIC LIGHTING AT CHELTENHAM.—In the JOURNAL last week (p. 498), we gave extracts from a report prepared by the Committee appointed by the Cheltenham Town Council to consider the question of introducing the electric light into the town. This was brought forward for discussion at a meeting of the Council yesterday week. In moving its adoption, the Chairman of the Committee (Mr. G. Norman) alluded to the "remarkable spread" of electric lighting in London, Brighton, and other towns, and said he believed the satisfactory and economical lighting of the public streets by electricity was to be obtained by combining it with the lighting of private houses, as was proposed by the Committee. The experience of Leamington had, he said, proved that the incandescent system was of no use for street lighting; but wherever the arc system had been properly installed, nothing like failure had resulted. He therefore asked that the Committee should be permitted to proceed with the matter, and obtain tenders, to be submitted to a future meeting of the Council. Alderman Griffith seconded the motion, which was opposed by Alderman Parsonage, who strongly objected to the ratepayers being saddled with the expense of what he thought would be a costly experiment. The resolution was, after full discussion, carried; and the request for permission to obtain tenders was acceded to.

BRADFORD CORPORATION WATER SUPPLY.—At the meeting of the Bradford Town Council on Tuesday last, the minutes presented by the Water Committee stated that the Chairman (Alderman Robertshaw) had called the attention of the Committee to the report submitted by the Special Committee in September, 1882, on the subject of filter-beds; and as the Gilstead works were found to be satisfactory, he deemed it desirable that the Committee should consider whether they would extend their operations to the Thornton Moor reservoir. With the view of laying the fullest information before the Committee, he and the Deputy-Chairman had caused plans to be prepared for their consideration, and the Water Engineer (Mr. A. R. Binnie) submitted them. Discussion arose thereon; and it was arranged that the whole Committee should visit the ground before coming to any conclusion. Alderman Robertshaw, in moving the adoption of the proceedings, said the filter-beds referred to constituted the final portion of a scheme for which powers were obtained in 1878 for filtering water at Barden, Thornton Moor, and Stubden. The Committee visited Thornton Moor the previous week, and inspected the site; and they found a portion of land belonging to the Corporation which was well adapted to the purpose. Consequently, they unanimously came to the conclusion that the land ought to be used; but as to how the works were to be carried out, they had not yet come to any decision. The minutes were passed.

THE BIRMINGHAM CORPORATION AND GAS-FITTING.—Last Friday, a meeting of the gas-fitters who signed the memorial praying the Birmingham City Council to order an inquiry into the circumstances under which the Corporation trade in gas-fittings, was held, under the presidency of Mr. G. Hadley. The Chairman referred at length to the grievances of the gas-fitters of Birmingham, who had, he said, to enter into competition with the Gas Committee of the Corporation, who were engaged in trade. The memorial sent to the Council had been referred to the Finance Sub-Committee of the Gas Committee, and it was advisable, therefore, that the signatories should be prepared with representatives of the trade to attend before the Sub-Committee. He moved—"That this meeting of gas-fitters is of opinion—and the opinion is based on practical and bitter experience—that the Birmingham Corporation, by trading in gas-fittings, is acting in a manner inimical not only to the interests of the trade, but also to the best interests of the ratepayers, inasmuch as it is bad in policy and immoral in practice to use the rates to injure and ruin any section of the ratepayers." Mr. Parkes seconded the motion, and it was carried unanimously. Mr. Dowler Green moved—"That there be a Committee of eight gentlemen appointed to represent the interests of the trade, and keep alive the agitation against the trading of the Gas Department in competition with the ratepayers." This was also carried, and the proceedings closed.

PROPOSED IMPROVED PUBLIC LIGHTING OF IPSWICH.—At the meeting of the Ipswich Town Council last Wednesday, Mr. E. P. Ridley proposed—"That the Paving, Lighting, and General Street Cleansing Committee be instructed to take into consideration the advisability of increasing the burners of the 609 public lamps now consuming 3½ cubic feet of gas per hour to burners consuming 5 cubic feet per hour, from the 1st of October next." He referred to the complaints which were constantly being made with reference to the insufficient lighting of the town, and said there was no other town in the Eastern Counties in which lamps burning so little as 3½ cubic feet of gas per hour were used—a large proportion of them employing 5-feet, and some of them 6-feet burners—and yet there was no town in the Eastern Counties in which the authorities were charged less per 1000 cubic feet for the gas consumed; so that evidently the price was not an obstacle to the increase of light. There were in the borough 891 lamps, of which 282, principally in the main thoroughfares, consumed 5 cubic feet per hour, the average distance between them being 55 yards; whereas the 609 lamps which burnt only 3½ cubic feet per hour were from 60 to 70, and in some cases more than 80 yards apart. Mr. Ridley went minutely into the cost of carrying his proposition into effect, and showed that, taking into consideration the reduced price of gas, the extra charge would not amount to more than £257 10s. 4d., or just about a farthing rate; and even this amount might, he said, be reduced by negotiations with the Gas Company, who had already promised, if the whole of the lamps were supplied with 5-feet burners, to allow an additional discount. The proposition was agreed to.

PROPOSED EXTENSIONS AT THE BLACKBURN GAS-WORKS.—The Blackburn Corporation have applied for an Order to amend certain of the provisions of the Blackburn Improvement Acts of 1879 and 1882, so as to extend their borrowing powers, and enable them to effect improvements in their gas, water, and sewage undertakings. By the Act of 1879, the Corporation were empowered to borrow £30,000 for gas-works; and it is now proposed to extend this sum to £40,000, so as to allow of the construction of a new gasholder, which is estimated to cost £6000, and pay for the laying of mains.

MEXBRO' WATER SUPPLY.—The Local Government Board have written to the Mexbro' Local Board, inquiring what steps are being taken with regard to the water supply in that township; and the matter came before the Board at their meeting last Wednesday. In the course of the consideration of the subject, the opinion was expressed that the time had arrived when the Board should take steps to obtain the control of the water supply; while another member thought a new supply should be procured. Mr. Watson suggested that an offer for their property should be made to the Water Company of 20 or 25 years' purchase, on the average dividend of the past three or four years. Mr. Tiptaft proposed that negotiations be opened with the Company, to see whether an agreement could be arrived at; and this was agreed to.

NEW READING-ROOM AT THE LEICESTER GAS-WORKS.—On Saturday, the 9th inst., a new reading-room which has been built in connection with the extension of the Leicester Corporation Gas-Works, was opened. The room is one of the block forming the second section of the work, and completes the suite, which includes mess-room, baths, and lavatories for the men engaged at the Aylestone Road branch. It is situated on the upper floor, reached by a wide stone staircase; and while there is nothing in the way of elaborate decoration, the room has a light and cheerful appearance, and is admirably adapted for its purpose. At present about 200 volumes have been contributed for the use of the members, and there is space for as many more. The room is under the management of a Committee selected from all the branches of the Gas Department, with Mr. A. Colson, Assoc. M. Inst. C.E., the Engineer, as President.

PROJECTED ELECTRIC LIGHTING SCHEME FOR CHESTER.—Last Friday week, a meeting of gentlemen interested in the formation of a central station for the supply of electricity in Chester was held at the Town Hall, to confer as to the expediency of introducing the electric light into the city. Mr. T. V. Hughes, an electrical engineer of the city, said he and his friend Mr. Manville were interested in electric lighting from central stations. He had canvassed the neighbourhood, and had received promises for about 3000 lights from several of the more prominent citizens; and this being so, they had prepared an estimate on that basis. Mr. Manville subsequently addressed the meeting, entering into many details in connection with the proposals. A desultory discussion followed; and in the end, Messrs. Hughes and Manville were requested to prepare a circular giving information as to cost, &c., of a central supply station.

SULPHATE MANUFACTURE AT THE HEYWOOD CORPORATION GAS-WORKS.—The Heywood Corporation Gas Committee submitted to the Town Council last Thursday proposals for the erection of a new sulphate plant. Mr. Lawton explained that a Sub-Committee had visited a number of towns, seen the sulphate plant in use, and made inquiries. From the answers received, they believed it would be of benefit to the Gas Department to have a plant on Dr. Feldmann's patent. The agent had visited Heywood, and said that part of the old plant could be adapted to the new. The Committee decided to accept the matter with the consent of the Council. They were thoroughly convinced that the plant would result in a considerable saving. Mr. M'Farlane inquired as to the results of the Feldmann plant. Alderman Marlor said the Sub-Committee made a report as to the apparatus that was absolutely favourable. The minutes were confirmed.

SUGGESTED ADOPTION OF ELECTRIC LIGHTING AT DORCHESTER.—An application was recently made to the Dorchester Gas Company by the Town Council for a reduction in the charge for the public lighting. The Directors, in reply, reminded the Council that the terms of the contract of 1887 were approved of by the Corporation, and as the cost of producing gas is the same now as it was then, they could not see their way to making any alteration in the price. At the last meeting of the Town Council, Mr. George said he thought the Company were pressing the Corporation very hard, because there was now in London a company who were willing to supply the electric light at a rate equivalent to 4s. per 1000 feet of gas, and in Dorchester they were well situated for electric lighting, because water power could be utilized. If the Gas Company pressed them too hard, it would be worth while to consider whether it would not be cheaper to introduce the electric light in Dorchester. After further discussion, it was resolved to apply to the electric light company in question to furnish an estimate for the supply of the light. It was also resolved to inform the Gas Company that the Council did not consider the letter satisfactory.

THE GAS, WATER, AND GENERAL INVESTMENT TRUST, LIMITED.—The first ordinary general meeting of this Company was held at Winchester House, Old Broad Street, E.C., last Friday—Mr. T. Salt, M.P., in the chair. The Secretary (Mr. J. A. Kelman) having read the notice calling the meeting, the Chairman remarked that, as the Company was only just beginning business, the Directors could not furnish such detailed statements as they hoped to be able to do on future occasions. They had invested all the money at their disposal to, as he thought, good advantage; the average rate of interest being close upon 6 per cent., while nearly every investment showed an advance on the price at which the stock had been bought. Their policy was to conduct their business very carefully, and not to make large investments in any particular concern, however good it might be; and he hoped the shareholders would support the suggestion he was about to make, that they should be content with a moderate dividend, and build up a really good and substantial reserve. A portion of their scheme was to issue debentures; and he thought the time was nearly at hand when they would be able to do this. He further stated (in answer to a proprietor) that 50,000 shares—equal to £500,000—had been allotted. The meeting was then made special for the purpose of altering the Articles of Association to meet the requirements of the Stock Exchange Committee, and the proceedings closed.

THE PUBLIC LIGHTING DISPUTE IN DUBLIN.—In the Exchequer Division of the High Court of Justice of Ireland last Thursday, application was made, on behalf of the Alliance Gas Company, for final judgment against the Corporation of Dublin on a specially endorsed writ for a sum of £6826 for gas sold and delivered, and for work and labour done by the Company in connection with the public lamps. The Corporation disputed the claim, on the following grounds:—That the quantity of gas charged for had not been supplied; that the lamps were not kept in proper order; that facilities had not been afforded for testing the gas, nor proper apparatus provided; and that the testing-place was on an improper site. They submitted that these matters should be referred to arbitration; and that if this were done, the claim of the Company would be reduced by about £1800. Mr. P. Martin, Q.C., for the Company, argued that it was no answer to their claim to raise these questions. The defendants, on their own showing, admitted that they owed at least £5000; and this ought to be paid. Mr. S. Walker, Q.C., on behalf of the Corporation, said they had a motion also to refer the matter in dispute to arbitration, and they would consent to allow the entire case to stand over until the next sittings, giving the plaintiffs within a week a cheque for £5000. They had throughout offered to pay this sum without prejudice to their case on the points raised by them. The matter was then allowed to stand over as arranged.

GAS AND WATER COMPANIES' STOCK AND SHARE LIST.

(For STOCK MARKET INTELLIGENCE, see *ante*, p. 525.)

Issue.	Share	When ex-Dividend.	Dividend or Div. & Bonus.	NAME.	Paid per Share	Closing Prices.	Rise or Fall in Wk.	Yield upon investment.
£			p. c.	GAS COMPANIES.				£ s. d
590,000	10	12 Oct.	10½	Alliance & Dublin 10 p. c.	10	19½—19½	..	5 7 8
100,000	10	,,	7½	Do. 7 p. c.	10	13—14	..	5 7 2
800,000	100	2 Jan.	5	Australian (Sydney) 5% Deb.	100	110—112	..	4 9 8
100,000	20	29 Nov.	10	Bahia, Limited	20	24—26	..	7 13 10
200,000	5	14 Nov.	7½	Bombay, Limited	5	6¾—7¼	..	5 8 5
40,000	5	,,	7½	Do. New	4	5¾—6¾	..	5 4 2
980,000	Stck.	14 Feb.	11	Brentford Consolidated	100	224—229	+1	5 2 7
125,000	,,	,,	8	Do. New	100	164—169	+1	5 3 7
220,000	20	14 Mar.	10½	Brighton & Hove, Original	20	43—44*	..	4 15 5
920,000	20	28 Sept.	11½	British	20	46—48	..	4 13 9
50,000	10	14 Mar.	11	Bromley, Ordinary 10 p. c.	10	19—21*	..	5 4 9
32,000	10	,,	8	Do. 7 p. c.	10	13—14*	..	5 14 3
328,750	10	14 Nov.	8	Buenos Ayres (New) Limited	10	14½—15¼	+⅛	5 3 2
200,000	100	2 Jan.	6	Do. 6 p. c. Deb.	100	107—110	..	5 9 1
150,000	20	28 Feb.	8	Cagliari, Limited	20	25—27	..	5 18 6
550,000	Stck.	12 Oct.	13½	Commercial, Old Stock	100	368—373	..	5 0 8
180,000	,,	,,	10½	Do. New do.	100	215—220	..	4 17 9
130,000	,,	28 Dec.	4½	Do. 4½ p. c. Deb. do.	100	123—128	..	3 10 3
557,320	20	13 Dec.	13	Continental Union, Limited	20	47—49	−1	5 6 2
242,680	20	,,	13	Do. New '69 & '72	14	34—36	..	5 1 0
200,000	20	,,	10	Do. 7 p. c. Pref.	20	38—40	..	5 0 0
75,000	Stck.	28 Sept.	10	Crystal Palace District	100	205—215	..	4 13 0
234,060	10	30 Jan.	13	European, Limited	10	25½—26½	..	4 18 1
120,030	10	,,	13	Do. New	5	7¾—8¼	..	5 2 7
354,060	10	,,	13	Do. do.	5	12—13	..	5 0 0
5,468,600	Stck.	14 Feb.	13	Gaslight & Coke, A, Ordinary	100	254—258	−1	5 0 10
100,000	,,	,,	4	Do. B, 4 p. c. max.	100	99—104	..	3 16 11
655,000	,,	,,	10	Do. C, D, & E, 10 p.c. Pf.	100	260—265	..	3 15 6
80,000	,,	,,	5	Do. F, 5 p. c. Prf.	100	128—138	..	3 18 1
60,000	,,	,,	7½	Do. G, 7½ p. c. do.	100	180—185	..	4 1 1
1,800,000	,,	,,	7	Do. H, 7 p. c. max.	100	170—175	..	4 0 0
468,000	,,	,,	10	Do. J, 10 p. c. Prf.	100	258—263	..	3 16 1
1,031,150	,,	13 Dec.	4	Do. 4 p. c. Deb. Stk.	100	120—123	..	3 5 0
294,850	,,	,,	4½	Do. 4½ p. c. do.	100	125—130	..	3 9 3
650,000	,,	,,	6	Do. 6 p. c. do.	100	174—179	..	3 7 0
3,600,000	Stck.	14 Nov.	10	Imperial Continental	100	209—212	−1½	4 14 4
75,000	5	13 Dec.	6	Malta & Mediterranean, Ltd	5	5—5½	..	5 9 1
560,000	100	1 Oct.	5	Met. of Melbourne, 5 p.c. Deb.	100	115—117	..	4 5 6
541,920	20	29 Nov.	6	Monte Video, Limited	20	18½—19½	..	6 3 1
150,000	5	29 Nov.	10	Oriental, Limited	5	9½—9¾	..	5 2 7
60,000	5	28 Sept.	7	Ottoman, Limited	5	6—7	..	5 0 0
166,870	10	16 Jan.	4	Pará, Limited	10	5¼—6	..	6 13 4
420,000	100	2 Nov.	6	People's Gas of Chicago—1st Mtg. Bds.	100	104—107	..	5 12 1
500,000	100	1 Dec.	6	2nd Do.	100	95—100	..	6 0 0
100,000	10	12 Oct.	10	San Paulo, Limited	10	16—18	+⅛	5 11 1
500,000	Stck.	28 Feb.	16½	South Metropolitan, A Stock	100	314—319	..	5 1 11
1,850,000	,,	,,	12½	Do. B do.	100	238—242	..	5 0 9
141,500	,,	,,	13½	Do. C do.	100	255—265	..	5 0 0
600,000	,,	28 Dec.	5	Do. 5 p. c. Deb. Stk.	100	137—140	..	3 11 5
60,000	5	28 Feb.	11½	Tottenham & Edm'nton, Orig.	5	11—13	..	4 8 5
						*Ex div		
				WATER COMPANIES.				
717,467	Stck.	28 Dec.	9	Chelsea, Ordinary	100	259—264	..	3 8 2
1,730,560	Stck.	12 Oct.	7½†	East London, Ordinary	100	211—215	..	3 9 9
700,000	50	15 Dec.	9	Grand Junction	50	122—126	..	3 11 5
708,000	Stck.	14 Feb.	10½	Kent	100	272—277	..	3 15 9
1,043,800	100	28 Dec.	9	Lambeth, 10 p. c. max.	100	254—259	..	3 9 6
406,200	100	,,	7½	Do. 7½ p. c. max.	100	199—204	+2	3 13 6
200,000	Stck.	28 Sept.	4	Do. 4 p. c. Deb. Stk.	100	119—123	+1	3 5 0
500,000	100	14 Feb.	12½	New River, New Shares	100	350—360	..	3 7 4
1,000,000	Stck.	30 Jan.	4	Do. 4 p. c. Deb. Stk.	100	123—126	..	3 8 6
902,300	Stck.	13 Dec.	6	S'thwk & V'xhall, 10 p.c. max.	100	169—174	+1	3 9 0
126,500	100	,,	6	Do. 7½ p. c. do.	100	160—165	−1	3 12 9
1,155,066	Stck.	,,	10	West Middlesex	100	264—269	..	3 14 4

† Next dividend will be at this rate.

SIXTH YEAR. Now Ready (Demy 8vo., Price 5s., or 5s. 6d. post free),

THE COMPLETE REPORTS OF THE PROCEEDINGS

OF THE VARIOUS

DISTRICT ASSOCIATIONS OF GAS MANAGERS

FOR 1888.

FORMING A COMPANION VOLUME TO THE TRANSACTIONS OF THE GAS INSTITUTE, WITH WHICH IT IS UNIFORM IN SIZE.

*** THE VOLUMES for 1883 to 1887 ARE STILL ON SALE.

LONDON: WALTER KING, 11, BOLT COURT, FLEET STREET, E.C.

GWYNNE & CO., ESSEX STREET WORKS, VICTORIA EMBANKMENT, LONDON, W.C.

GWYNNE & BEALE'S PATENT GAS EXHAUSTERS & ENGINES.

Telegrams: "GWYNNEGRAM, LONDON." Telephone No. 2698.

Exhausters of nearly all sizes in Stock.

Prize Medals at all the Great International Exhibitions.

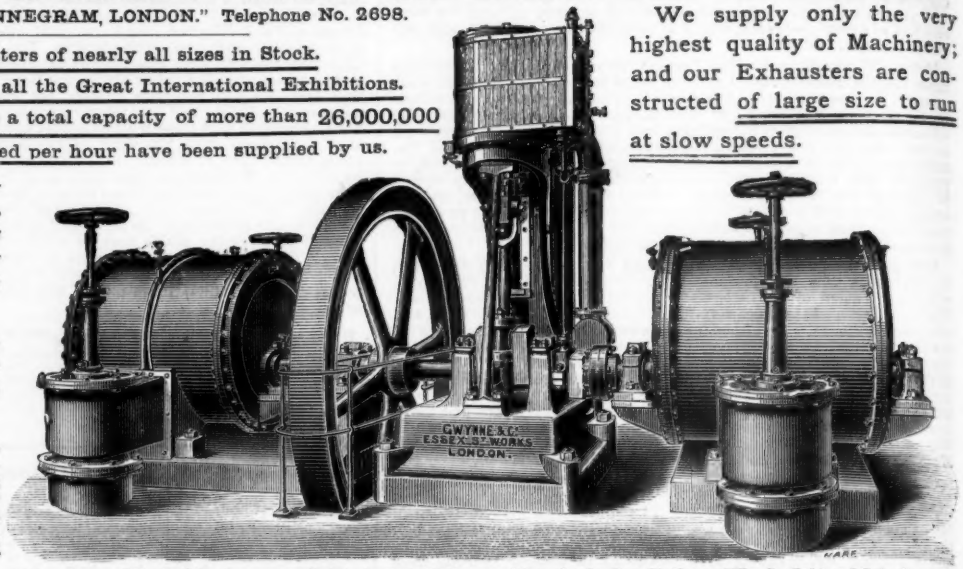
Exhausters equal to a total capacity of more than 26,000,000 cubic feet passed per hour have been supplied by us.

We supply only the very highest quality of Machinery; and our Exhausters are constructed of large size to run at slow speeds.

Our new Patent Non-Fluctuating Exhausters, to work without the slightest oscillation or variation in pressure, are strongly recommended.

MAKERS OF EVERY DESCRIPTION OF HYDRAULIC AND GAS MACHINERY.

Gwynne & Co.'s New Catalogue and List of Testimonials can now be obtained on application.



Exhausters and Vertical Engine as supplied for both the Fulham and Bromley-by-Bow Stations of The Gaslight and Coke Company.

OXIDE OF IRON.

O'NEILL'S Oxide has a larger annual sale in the United Kingdom than all other Oxides combined. Purity and uniformity of quality guaranteed. Pamphlet, "How to Purchase Bog Ore," to be obtained on application.

Gas Purification and Chemical Company, Limited, Palmerston Buildings, Old Broad Street, London, E.C.
JOHN WM. O'NEILL, Managing Director.

ANDREW STEPHENSON, Agent for the GAS PURIFICATION AND CHEMICAL COMPANY, Limited, Palmerston Buildings, Old Broad Street, LONDON, E.C.

CANNEL COAL, &c.

JOHN ROMANS & SON, EDINBURGH. Gas Engineers, supply all the most approved COTTISH CANNELS; also FIRE-CLAY GOODS, CAST-IRON PIPES, and other APPARATUS for GAS AND WATER WORKS.

Prices, &c., will be forwarded on application to No. 80, ST. ANDREW SQUARE, EDINBURGH, / No. 54, BERNARD STREET, LEITH, } SCOTLAND.

SULPHURIC ACID, B.O.V., for Sulphate of Ammonia Making. Guaranteed clear, of full strength, and to produce a fine white-coloured salt, Delivered in carboys or railway tank waggons.

For prices and terms address BALE, BAKER, AND Co., 120 & 121, Newgate Street LONDON.

THE GAS INSTITUTE.

THE Council respectfully request that all SUBSCRIPTIONS and COMMUNICATIONS relative to THE GAS INSTITUTE be addressed to Mr. William Longworth, Gas Offices, Guildford, who has been appointed Honorary Secretary, *pro tem.*
Dec. 29, 1888.

FITTER wants a Situation. Well up as Gas-Works Fitter. Willing to make himself useful. Married, steady, and industrious. Can be well recommended. Can leave present employment at once.

Apply to "FITTER," care of Mr. H. Wimhurst, Manager, Gas-Works, SLEAFORD.

GASFITTER, thorough, wants a Job on Works, Mains, Services, House Fitting, Illumination, &c. Just returned from abroad. Would go out again.

Address, C. H., 87, Hythe Street, DARTFORD.

WANTED, by a Total Abstainer, a Situation in a Gas-Works as WORKING MANAGER or FOREMAN. Has had good practical experience in Carbonizing, Fitting, Main and Service Laying, Reading Meters, and Repairs connected with Gas Plant. Good testimonials. Married.

Address No. 1668, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

FIRST-CLASS Draughtsman wanted, accustomed to Chemical Plant, especially for Sulphate of Ammonia and Tar Distillation. A liberal Salary will be paid.

Address, with age, full particulars, and salary expected, F. C. D., Messrs. Deacon's, LEADENHALL STREET, E.C.

REQUIRED, a competent Man to take charge of small Gas-Works. Must be strictly sober and steady. Married; no family. Wages 28s. per week, with House, Garden, Light, and Fuel.

Apply, by letter, enclosing copies of testimonials, to the MEDICAL SUPERINTENDENT, Surrey County Asylum, Brookwood, near WOKING.

TIMMIS & CO., of STOURBRIDGE Make only the best quality of FIRE-CLAY RETORTS, BRICKS, TILES, & LUMPS. Also SPECIAL SILICA BRICKS, to stand great heats. All descriptions kept in Stock.

For Prices apply to JAMES LAWRIE AND Co, 63, Old Broad Street, E.C., Sole Agents for London and District. Telegraphic Address: "EIRWAL, LONDON."

ALEX. WRIGHT & Co., 55, 55a, and 56, MILLBANK STREET, LONDON, S.W.
[Telegraphic Address: "PRECISION LONDON."]
Makers of Wet and Dry Gas-Meters, Station Meters and Governors, Photometers, and Gas-Testing Apparatus, Test Gasholders and Meters, Registering and other Gauges, &c., &c.

*** See Advertisement on Page III. of the Wrapper of last week's issue.

W. C. HOLMES & Co., Huddersfield, AND 80, CANNON STREET, LONDON,
Contractors for Gas-Works complete, Makers of Gasholders, Purifiers, Scrubbers, Condensers, Retort Fittings, &c., Improved Valves, Engines, and Exhausters. Also for Collingwood's Regenerative Retort-Settings.

*** See Advertisement p. 550 of this week's issue.
Cablegrams: "Ignitor London." Telegrams: "Holmes Huddersfield."

SHIPPING AND INSURANCE.

ROBERT BRUCE FITZMAURICE, 9, Crosby Square, London, E.C., Shipping Agent to several Foreign Gas Companies, is prepared to attend to the Forwarding and Insurance of Goods for Foreign and Colonial Gas Companies, &c., and Gas Plant Manufacturers.

For Rates of Freight, apply as above.

WANTED, a practical Plumber, one accustomed to Water-Works Plumbing, Repairing and Fixing Baths, Water-Closet Fittings, &c., and willing to make himself generally useful. Wages 28s. per week, and uniform. Permanency for suitable man.

Apply, with testimonials from last place, to the MANAGER of the Water-Works, Town Hall, Newport, MON.

BOROUGH OF ROCHDALE.
(GAS DEPARTMENT.)

WANTED, a thoroughly reliable and experienced Man as FOREMAN OF MAIN AND SERVICE LAYERS. Wages £2 per week.

Particulars as to the duties may be obtained on application to Mr. T. Banbury Ball, the Manager, at the Gas-Works.

Applications (in candidates' own handwriting), with testimonials, and endorsed "Foreman," must be sent to me not later than noon on Wednesday, the 27th of March, 1889.

By order,
ZACH. MELLOR, Town Clerk.
Town Hall, Rochdale, March 15, 1889.

ASSISTANT Secretary required in an Australian Colony. Must be experienced in similar employment in large Gas Companies in Great Britain, a thorough Accountant, skilful, and of good business tact, not over 35 years of age, and prepared to supply satisfactory proof of competence and reliability. Salary, subject to above qualifications, £500.

The undersigned, being now authorized to make arrangements, invite a renewal of the applications made in response to above advertisement on the 31st of July and the 14th of August, 1888, all suitable of which were forwarded to the Colony, but have not yet been returned.

Applicants should address
WM. COWARD & SONS.
143, Queen Victoria Street, London, E.C.

IRISH BOG ORE OXIDE OF IRON.

GAS PURIFICATION.

BALE, BAKER, & CO., direct Importers from Ireland. Sample and Price on application. Spent Oxide and Sulphate of Ammonia purchased.
120 and 121, NEWGATE STREET, LONDON, E.C.

TUBES.

FOR Gas, Steam, and Water; Galvanized, White Enamelled, and Hydraulic Tubes and Co.
JOHN SPENCER, Globe Tube Works, WEDNESBURY, and 14, Great St. Thomas Apostle, LONDON.

SULPHURIC ACID.

JOHN NICHOLSON & SONS, Chemical Works, LEEDS, specially produce this ACID for making SULPHATE OF AMMONIA of high quality and colour.

Highest References and all particulars supplied on application.

HUTCHINSON BROTHERS, Barnsley, Gas Engineers and Contractors, Makers of Gas-Meters and General Gas Apparatus, Sulphate of Ammonia Plant, Tools, and Sundries.

*** See large Advertisement in last week's issue, page 469.

JOHN RILEY & SONS, Chemical Manu- facturers, Hapton, near Accrington, are MAKERS of SULPHURIC ACID, from Brimstone, for Sulphate of Ammonia making. Highest percentage of Sulphate of Ammonia obtained from the use of this Vitrol. References given to Gas Companies.

WANTED, a small Capitalist to join (or otherwise) the Advertiser in working a Patent for an Article in good demand, now being patented in this Country and in France. Practical Gas Engineers or Managers preferred.

Apply by letter, in first instance, to No. 1683, care of Mr. King, 11, Bolt Court, FLEET STREET, E.C.

BELPER GAS COMPANY.

REQUIRED, 15 Clay Retorts, 5000 BRICKS, 3 tons of CLAY.

Tenders by the 5th of April, to JOSEPH PYM, Managing Director, BELPER.

STATION Meter required for Gas- Works—annual make 6 millions—with 6-inch Connections, Valves, and Bye-Pass complete. Second-hand Meter in perfect condition would suit.

Apply to M. J. SANTRY, KILLARNEY.

FOR SALE—Very cheap, Three 24-inch VALVES; Makers, Vickary and Co. Also Seven 12-inch VALVES; Makers, Willey and Co.

Apply to W. A. PADFIELD, Engineer and Secretary, Gas Offices, EXETER.

FOR SALE—A good stout Wrought-Iron OIL-TANK, 7000 gallons, and three Cast-Iron 4-inch SOCKET ROSIN STILL WORMS, with Wrought Iron Standards and Clips complete. To be immediately cleared for alterations of premises.

Apply to F. MORRIS, Tar and Rosin Distiller, Plough Bridge, Rotherhithe, LONDON, S.E.

SECOND-HAND Station Meter, by Sugg, with Works equal to new, passes 4000 feet per hour, will be sold cheap. New GAS PRESSURE REGISTER, by Cowan, with 900 Tell Tale Papers. Price £16. New HOURLY-RATE METER, by Cowan. Price £3 10s.

Apply to No. 1682, care of Mr. King, 11, Bolt Court FLEET STREET, E.C.

THE LITTLEHAMPTON GAS COMPANY, LIMITED.

FOUR Hundred £5 Shares, being a portion of the Additional Capital, authorized by the Company's Order of 1888, required for the carrying out of the provisions of that Order, and to enable the Company to meet the fast increasing demand for Gas, will be sold by auction, by

MR. CHAS. HENRY KNIGHT,

at the Norfolk Hotel, Littlehampton, in LOTS of FOUR SHARES each, on Monday, the 8th of April, 1889, at Three in the afternoon.

Full particulars and conditions of sale of the Company's SECRETARY, or of the AUCTIONEER, LITTLEHAMPTON.

CORPORATION OF LONGTON.

GASHOLDER, ETC., FOR SALE.

THE Gas Committee have the following Plant FOR SALE (in good condition), and are prepared to receive OFFERS for the same:—

GASHOLDER 60 feet diameter, and 28 feet deep, and Framework.

CAST-IRON VERTICAL CONDENSER, suitable for a daily make of 250,000 to 300,000 cubic feet.

For further particulars and to view, apply to the undersigned.

W. W. HULSE,
Secretary and Manager.

Gas-Works, Longton, Staffordshire,
March 9, 1889.

GLASGOW CORPORATION GAS.

RESIDUAL PRODUCTS FOR SALE, AND RESIDUAL PRODUCT WORKS TO LEASE.

THE Glasgow Corporation Gas Com- missioners are prepared to receive TENDERS for (1) the purchase of the TAR and AMMONIACAL LIQUOR produced at the Tradeston Gas-Works, from and after the 15th of May, 1889; and (2) the purchase of the TAR and AMMONIACAL LIQUOR produced at the Dawsholm Gas-Works from and after the 1st of July, 1889, and a lease of the RESIDUAL PRODUCT WORKS belonging to the Commissioners, adjacent to the Gas-Works, from and after same date.

Forms of tender, on which offers must be made, and copies of the "Terms and Conditions" upon which the Products are to be sold and the Residual Product Works are to be let, may be had on application to the Manager, at the Gas Office, 42, Virginia Street, Glasgow; and offers, endorsed "Tender for Tradeston Residual Products," or "Tender for Dawsholm Residual Products and Works," will be received by the subscriber, on or before Tuesday, the 26th of March next.

The Commissioners do not bind themselves to accept the highest or any tender.

J. D. MARWICK, Town Clerk.

City Chambers, Glasgow, Feb. 27, 1889.

CROYDON.

SALE OF 278 GAS SHARES, PAYING DIVIDENDS AT THE RATE OF 11 PER CENT.

ROBT. W. FULLER, MOON, & FULLER have received instructions to Sell by auction at the Greyhound Hotel, on Thursday, April 11, at Five for Six o'clock, 278 SHARES in the CROYDON COMMERCIAL GAS AND COKE COMPANY, comprising 200 Third Capital Shares of £5 each, and 78 "B" 1876 Capital Shares of £5 each, all fully paid up, and paying dividends at the rate of 11 per cent. (being an increase of 1 per cent. on former Dividends).

Particulars of any other Shares to be included in the above Sale should be forwarded to the Auctioneers by the 28th inst.

Auction and Estate Agency Offices, Croydon, Reigate, and Epsom.

LYTHAM IMPROVEMENT COMMISSIONERS.

TENDER FOR CAST-IRON GAS-PIPES.

THE Lytham Improvement Commis- sioners are prepared to receive TENDERS for the supply of about 3650 yards of 3-inch, 350 yards of 4-inch, 1000 yards of 5-inch, 1750 yards of 8-inch, 100 yards of 14-inch CAST-IRON GAS-PIPES.

Specifications, forms of tender, and further information may be obtained by forwarding stamped addressed envelope to the undersigned.

Tenders, endorsed "Tender for Iron Pipes," must be sent to the Chairman of the Gas Committee, on or before the 28th of March inst.

CHAS. A. MYERS, Manager.

TENDERS FOR GAS LANTERNS AND PILLARS.

THE Lytham Improvement Commis- sioners invite TENDERS for the supply and delivery at Lytham of 27 LANTERNS with PILLARS and FITTINGS, suitable for Lighting the Promenade —the Lanterns to give a light of not less than 40 candles; and the Pillars not to exceed 10 ft. 6 in. in height.

Endorsed tenders, to the Chairman of the Highways Committee, to be sent in before the 28th inst.

CHAS. A. MYERS, Gas Manager.

TENDERS FOR TAR AND LIQUOR.

THE Rugby Gas Company are prepared to receive TENDERS for the Surplus TAR and LIQUOR made at their Works, for either One, Two, or Three years, commencing the 31st of March.

Tenders to be sent in, under cover, to the undersigned on or before Wednesday, the 3rd of April.

The Directors do not bind themselves to accept the highest or any tender.

Particulars may be had from

P. SIMPSON, Manager.

Rugby, March 9, 1889.

TO TAR DISTILLERS.

THE Directors of the Devonport Gas and Coke Company invite TENDERS for the surplus TAR produced at their Works.

For particulars apply to

JOHN WILLIAMS, Secretary.

March 15, 1889.

TENDERS FOR TAR.

THE Burgess Hill Gas Company, Limited, have about 5000 gallons of TAR FOR SALE, and invite TENDERS for same, which must be sent to Mr. S. NORMAN, Secretary, Burgess Hill, SUSSEX, on or before the 22nd inst.

PENRITH LOCAL BOARD.

TENDERS FOR COAL AND CANNEL.

THE Gas Committee of the Penrith Local Board are prepared to receive TENDERS for the supply of about 2000 tons of GAS COAL and about 500 tons of CANNEL, to be delivered at Penrith Railway Station in such quantities as may be directed during the year ending the 30th of June, 1890.

TENDERS FOR RETORTS, FIRE-BRICKS, AND CLAY.

TENDERS for a quantity of Retorts, FIRE-BRICKS, and FIRE-CLAY are also invited.

Full particulars can be obtained from Mr. E. Shaul, Gas Manager, Penrith.

Sealed tenders, endorsed "Tender for Coal" or "Retorts, &c.," must be sent to the undersigned on or before Saturday, the 6th day of April next.

GEORGE WAINWRIGHT, Clerk.

Public Offices, Penrith, March 15, 1889.

SPENT OXIDE OF IRON.

THE Brighouse Local Board are pre- pared to receive TENDERS for the purchase of about 70 tons of SPENT OXIDE of IRON, now lying at the Gas-Works ready for immediate delivery.

Payment, cash on delivery.

The Local Board will deliver the Oxide into barges on the Calder and Hebble Canal (alongside the Gas-Works), or into railway trucks at Brighouse Station.

Further particulars and sample can be obtained upon application to the undersigned.

Tenders are to be sent in, addressed to Richard Kershaw, Esq., Chairman of the Local Board, Public Offices, Brighouse, on or before Wednesday, the 20th day of March, 1889, endorsed on the outside "Spent Oxide."

JAMES PARKINSON,
Engineer and Manager.

Public Offices, Brighouse, March 1, 1889.

C. & W. Walker,

Gasholders, — Purifiers,
Purifying Machines.

C. O2 & Tar extracting Washers, — Scrubbers,
Sulphate and Sulphur Plants.

Retort Mouthpieces, Condensers, Lifting apparatus,
Centre and Four way Valves, — Slide valves, &c., &c.,
Wood Sieves and Tar Burners.

Addresses:— 8. Finsbury Circus, London.
Midland Works, Donnington, Salop.

Telegraphic Address.—Fortress London, or Fortress Donnington.

THE Hindley Local Board are prepared to receive TENDERS for the supply of 750 yards of 4-inch and 250 yards of 3-inch CAST-IRON GAS-PIPES and SPECIALS; also for RETORTS and FIRE-BRICKS.

For particulars apply to Mr. Dickinson, Gas and Water Manager.

Sealed tenders to be lodged with the undersigned not later than the 27th of March inst.

By order,
STEPHEN HOLT, Clerk.

Hindley, March 15, 1889.

STAINES AND EGHAM DISTRICT GAS AND COKE COMPANY, LIMITED.

THE Directors of this Company invite TENDERS for the purchase of the whole of the AMMONIACAL LIQUOR and surplus TAR produced at their Works for One, Two, or Three years.

The Tenders to state the price per butt of 108 gallons for Liquor of 10 oz., 12 oz., and 14 oz.; and the price per gallon for Tar.

Both the Liquor and Tar will be pumped by the Company's Engines into the Contractor's Barge alongside the Company's Wharf.

Full particulars may be obtained of Mr. T. Webb, the Manager at the Works.

Tenders to be sent on or before the 2nd of April next to the undersigned.

JOHN ANTHONY ENGALL,
Solicitor and Secretary.

Staines, March 8, 1889.

STAINES AND EGHAM DISTRICT GAS AND COKE COMPANY, LIMITED.

THE Directors of this Company invite TENDERS for the supply and delivery of 6000 tons of EAST PONTOP or PELAW MAIN and YORKSHIRE SILKSTONE GAS COALS per annum for One, Two, or Three years, in quantities per Month as ordered by the Company's Manager. The year will commence on the 1st of October, and end on the following 30th of September.

The Company's Works are on the Bank of the Thames, and outside the City Coal Dues boundary.

The Coals must be thoroughly screened, and free from Slate and Bats.

Tenders to be sent, with a sample of Coal, to the undersigned on or before the 2nd of April next.

JOHN ANTHONY ENGALL,
Solicitor and Secretary.

Staines, March 8, 1889.

EXHAUSTER WANTED.

THE Gas Committee of the Corporation of Blackpool are prepared to receive TENDERS for the supply of a BEALE GAS EXHAUSTER, capable of passing 50,000 feet per hour; also HYDRAULIC REGULATOR for Steam.

Particulars may be obtained at the Office of the undersigned.

Tenders to be endorsed outside, and addressed to the Chairman of the Gas Committee by the 23rd day of March.

By order,
JOHN CHEW, Gas Engineer.

Corporation Gas-Works, Blackpool,
March 10, 1889.

SCARBOROUGH GAS COMPANY.

TAR AND AMMONIACAL LIQUOR.

THE Directors of the Scarborough Gas Company are prepared to receive TENDERS for the purchase of the AMMONIACAL LIQUOR and surplus TAR produced at their Works for One year, from the 18th day of April next.

Conditions of tender and necessary particulars will be supplied on application to the undersigned, to whom tenders, in accordance with such conditions, and properly endorsed, must be delivered not later than Noon on Monday, the 8th day of April next.

By order,
WILLIAM J. MOON,
Secretary and Manager.

Gas Offices, Scarborough, March 15, 1889.

THE Cleckheaton Local Board are prepared to receive TENDERS for the Supply and Fixing of the under-named GAS APPARATUS, viz.:—

Exhauster and Engine combined, with Compensator and Bye-Pass Arrangement, to pass 30,000 cubic feet of Gas per Hour.
Two Disc Valves.
Rotary Washer, capable of passing 500,000 cubic feet of Gas per diem.

Any further information to be had from Mr. Niven, the Board's Gas Engineer.

Tenders, properly endorsed, to be deposited with the undersigned before Four o'clock p.m. on Monday, the 1st day of April next.

The lowest or any tender will not necessarily be accepted.

By order,
J. ARMITAGE, Clerk.

Cleckheaton, March 12, 1889.

BRITISH GASLIGHT COMPANY, LIMITED.

NOTICE is hereby given that the HALF-YEARLY ORDINARY GENERAL MEETING of the Proprietors of this Company will be held at this Office on Wednesday, the 27th inst., at Half-past Twelve o'clock precisely, to transact the usual Business, and to declare the Dividend for the Half Year ended the 31st of December last.

NOTICE IS HEREBY ALSO GIVEN that the Transfer Books of the Company will be closed on the 10th, and re-opened on the 28th inst.

By order of the Court of Directors,
FREDERIC LANE LINGING,
Secretary.

Chief Office: No. 11, George Yard,
Lombard Street, London, E.C.,
March 8, 1889.

EAST LONDON WATER-WORKS COMPANY.

NOTICE is hereby given that the HALF-YEARLY ASSEMBLY of Proprietors will be held at the Company's Office, St. Helen's Place, Bishopsgate, E.C., on Tuesday, the 2nd of April, 1889, at Twelve o'clock noon precisely, pursuant to Act of Parliament.

The Transfer Books in respect of the Ordinary Stock will be closed on the 19th of March inst., and re-opened on the 9th of April, on which day the Dividends on this Stock will be payable.

By order,
I. A. CROOKENDEN, Secretary.

St. Helen's Place, E.C., March 5, 1889.

COMMERCIAL GAS COMPANY.

NOTICE is hereby given that an ORDINARY MEETING of the Commercial Gas Company will be holden at the Cannon Street Hotel, in the City of London, on Friday, the 5th of April, 1889, at Twelve o'clock at Noon—

To receive the Report of the Directors.
To declare a Dividend.
To elect Directors and an Auditor in the place of those retiring.
To elect an Auditor in the place of a deceased Auditor.
To increase the remuneration of the Secretary, and for other Business.

The Stock Transfer Books will be closed from the 23rd of March inst. to the 5th of April next both days inclusive.

By order of the Board,
H. D. ELLIS, Secretary.

Offices, Stepney, March 14, 1889.

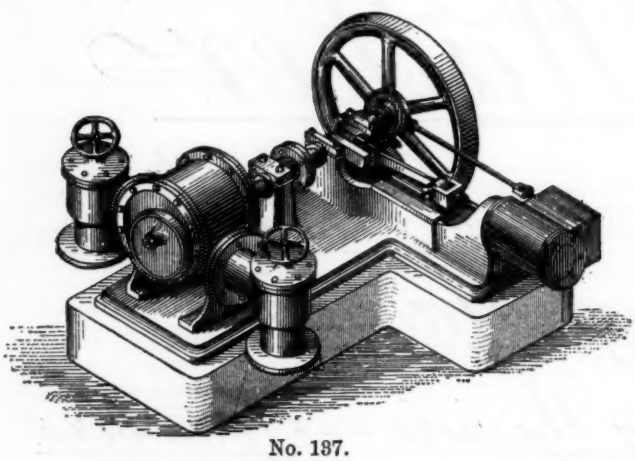
G. WALLER & Co.'s NEW PATENT GAS EXHAUSTER.

MADE WITH FOUR OR THREE BLADES.

In use at, or on order for, over 120 *Works, equal to* 6,840,000 *Cubic Feet per Hour.*

Oldest Makers of Beale Exhausters for over 300 Works and 25,600,000 cubic feet per hour.

1,000 to 250,000 CUBIC FEET PER HOUR WITH OR WITHOUT ENGINE COMBINED.



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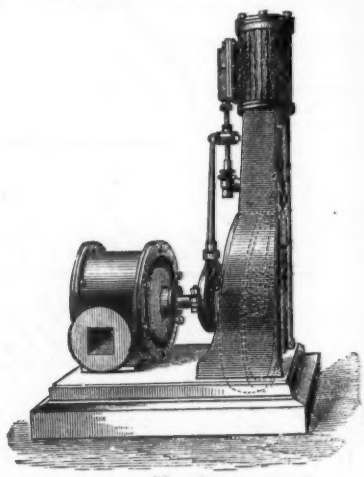

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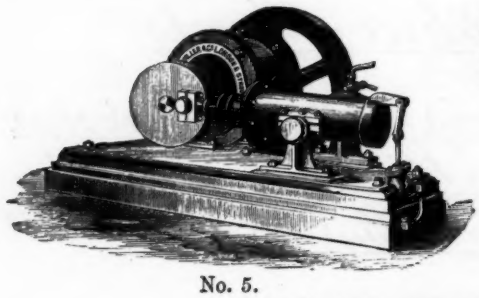

No. 5.

No. 137.—Horizontal Combined Engine and Exhauster.
No. 6.—Vertical ,, for small space.
No. 5.—Oscillating ,, for small works.

BYE-PASS VALVES.

Disc, Rack, and Screw Valves, Compensating Governors (For Steam Throttle Valves),

Tar, Liquor, and Water Pumps, Hydraulic Main Valves, Coke-Breaking Machines.

SEE PREVIOUS ADVERTISEMENTS. ILLUSTRATED CATALOGUE ON APPLICATION.

Phœnix Engineering Works, Park Street, Southwark, London, S.E.,

NEAR SOUTHWARK BRIDGE (FOUR MINUTES FROM HOLLAND STREET), AND AT

STROUD, GLOUCESTERSHIRE.

THE Directors of the Farnham Gas Company, Limited, invite TENDERS for the Supply and Delivery of 500 tons of the Best NEW PELTON or PELAW MAIN GAS COAL, in quantities of 50 tons, between the 31st of March inst., and the 30th of June next.

The price to be per ton delivered free at Farnham, Surrey, Railway Station.

Sealed tenders (on forms which can be had on application to the undersigned), endorsed "Tender for Coal," to be sent in to me not later than Monday, the 24th of March inst., at Twelve o'clock noon.

The Directors will not be bound to accept the lowest or any tender.

WILLIAM WELLS, Secretary.

Farnham, Surrey, March 5, 1889.

BOROUGH OF BURTON-UPON-TRENT.

TO COLLIERY PROPRIETORS.

THE Gas Committee of the Corporation of the Borough of Burton-upon-Trent are prepared to receive TENDERS from Colliery Proprietors for the supply of from One to Ten Thousand Tons (Twenty-one cwts. to the Ton) of BEST SCREENED GAS COAL, to be delivered in Sender's or Railway Company's Trucks at the Gas-Works, Railway Siding, Burton-upon-Trent, between the 1st day of April next and the 31st day of March, 1890.

The deliveries are to be made in such quantities and at such times as may be directed by the Manager.

Payments: Net cash monthly.

Tenders, enclosed in an envelope, sealed and endorsed "Tender for Coal," are to be delivered to me at or before Ten a.m. on Saturday, the 30th of March inst.

The Committee reserve to themselves the right of rejecting the lowest or any tender.

F. L. RAMSDEN,
Manager and Engineer.

Gas-Works, Burton-upon-Trent,
March 13, 1889.

TO INVENTORS AND PATENTEES.

MR. W. H. BENNETT having had considerable experience in matters connected with Gas, Water, and Sanitary Improvement, begs to say that he continues to assist Inventors in the perfection of their designs, and to obtain for them PROVISIONAL PROTECTION, whereby their Invention may be secured for Twelve months; or LETTERS PATENT, which are granted for Fourteen Years.

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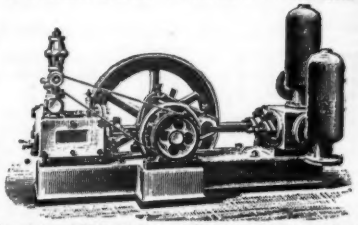

Fig. 685.—EVANS' Patent "RELIABLE" REVERSIBLE TAR and LIQUOR PUMP. In use everywhere. The Best in the World.

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FOR DRILLING AND TAPPING WATER MAINS AND GAS MAINS UNDER PRESSURE.

Patent Saddle Back and Drilling Apparatus, whereby Gas and Water Mains can have 2-in., 3-in., 4-in., 5-in., and 6-in. Branches put on without loss of Water or Gas.

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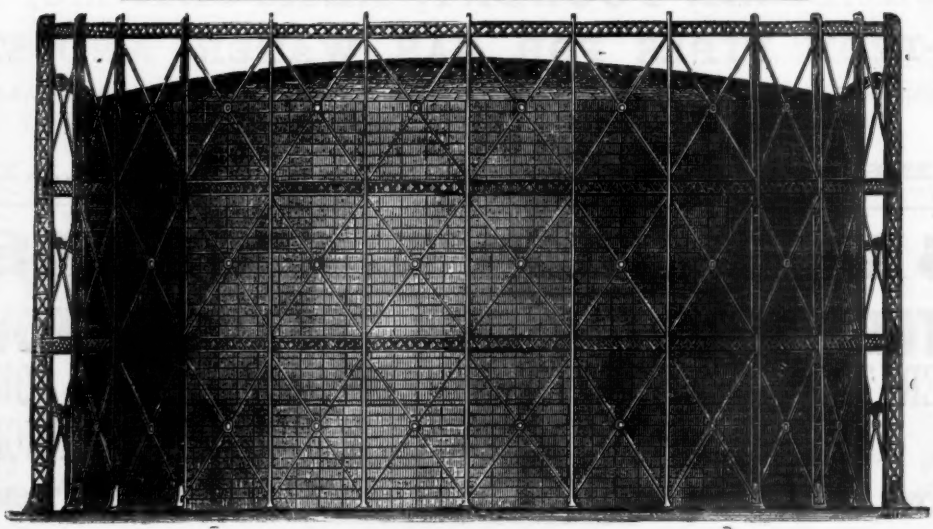

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PATENT

DIFFERENTIAL TAR AND LIQUOR OVERFLOWS

AND

TAR SCREEN

FOR HYDRAULIC MAINS.

This Apparatus is being successfully used at many Works; amongst others, at all the Stations of the South Metropolitan Gas Company, and at the Silvertown Works of The Gaslight and Coke Company, besides large Provincial Works.

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Croydon Commercial Gas and Coke Company,
May 29, 1888.

Messrs. S. CUTLER & SONS,

GENTLEMEN,—In answer to your letter of the 26th inst., I am pleased to be able to say that I am so satisfied with the LIVESEY AND TANNER TAR OVERFLOWS which I have had in use during the past winter, that I have recommended their adoption throughout our retort-houses.

I am, yours faithfully, J. W. HELPS.

Gas-Works, Tunbridge Wells,
May 30, 1888.

Messrs. S. CUTLER & SONS,

GENTLEMEN,—I have much pleasure in saying that LIVESEY AND TANNER'S TAR AND LIQUOR OVERFLOWS, which have been fitted to all our Hydraulic Mains, have given me complete satisfaction.

The use of New Boghead Cannel has been reduced from 2·72 per cent. to 0·10 per cent.; and at the same time the illuminating power has been increased by a quarter of a candle, when working under precisely the same conditions in other respects.

I have also adopted them in a small works, to which I consider they are equally suited, as they work freely, and require very little attention.—Yours faithfully,

ANDREW DOUGALL, Jun., Assoc. M. Inst. C.E.

Gas-Works, Tunbridge Wells,
Feb. 15, 1889.

Messrs. S. CUTLER & SONS,

GENTLEMEN,—In reply to your inquiry respecting LIVESEY AND TANNER'S TAR AND LIQUOR OVERFLOWS, I have much pleasure in saying that they continue to give every satisfaction.

A few months ago I had a very striking proof of their value. I started four Beds without the "Overflows," allowing the Tar to travel along with the Gas, when the illuminating power dropped a candle, and did not regain the loss until the "Overflows" had been put into operation. This experiment was repeated with the same result.

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ANDREW DOUGALL, Jun., Assoc. M. Inst. C.E.

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ASBESTOLINE has beaten all other Lubricants in trials.
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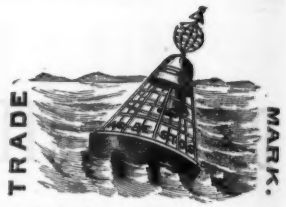

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ASBESTOLINE, to meet all circumstances, is made in four degrees of consistency—A, B, C, and CC.

ASBESTOLINE, A, is specially adapted to ordinary Land Engines and Machinery, in and out door, in this country.

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ASBESTOLINE, C, is for use in tropical climates, both ashore and afloat. It is also invaluable in works in this country when the temperature is high.

ASBESTOLINE, CC, is designed for use on Calenders, Paper-Machines, &c., where the bearings are heated by steam passing through, and sometimes is advantageously used instead of C.

The reputation of Asbestoline as a Lubricant of the highest efficiency in every kind of Machinery is established; and it has never been equalled by any other Lubricant in the numerous cases of special difficulty in which the best oils are ineffectual. It is used with marked success in Steel and Iron Works, Collieries, Cotton and Wool Mills, and other Textile Manufactories. In Corn-Mills it has proved invaluable on the roller and other modern machines. In Saw-Mills, on machines going up to 5000 revolutions per minute, its work has never been approached by any other Lubricant. On Electric Lighting Machinery, and in Steamships of all sizes throughout the world, the success of Asbestoline is unequalled. Many engines and machines of all descriptions give trouble, and show bad results both in working and wear, when the system of lubrication has not received due consideration. Engineering firms of the highest standing have given to it their powerful testimony and support.

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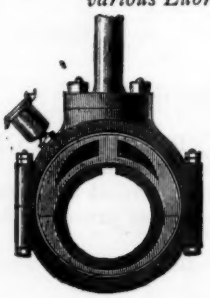
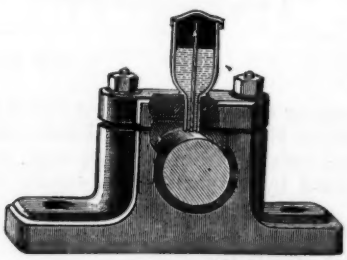
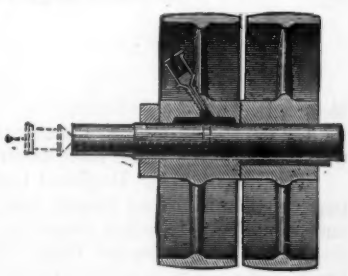
Below will be found illustrations of the mode of fixing Lubricators for Asbestoline to bearings. Full particulars of the various Lubricators supplied for Asbestoline, and the manner of fitting, in catalogue free on application.



Lubricator fitted to Eccentric of Vertical Engine



Showing Section of Lubricator fitted to ordinary Bearings.



Lubricator in different position for Loose Pulleys.

THE ATTENTION OF

ENGINEERS, AND ALL USERS OF STEAM POWER AND MACHINERY,

IS SPECIALLY INVITED TO THE FOLLOWING REPORT.

Owing to the number of Greases now offered, samples of BELL'S ASBESTOLINE were submitted to Otto Hehner, Esq., for analysis, and the subjoined Report fully proves BELL'S ASBESTOLINE to be the safest as well as the best Lubricant for all purposes:—

The Laboratory, 11, *Billiter Square, E.C., London, May* 3, 1888.

I have subjected a sample of Bell's Asbestoline taken from the stores of Messrs. J. Bell and Son, in Southwark Street, to a number of tests, in order to ascertain whether its use in Mills or Factories might contribute to the danger from Fire.

I found that Asbestoline **ignites only with the greatest difficulty** when brought into contact with flame; that wood and other combustible material soaked in Asbestoline burns, if anything, with greater difficulty than by itself; that its **flashing point** is so high that it **lies beyond the range of Mercurial Thermometers**; and that consequently no friction obtainable in the ordinary run of machinery is capable of developing inflammable vapours from it.

Bell's Asbestoline is **as absolutely safe a Lubricant as can be desired or obtainable.** In the case of fire breaking out from any cause, it does not assist the conflagration; and it is **quite incapable of leading to spontaneous combustion,** either by itself or in contact with inflammable material.

From the physical nature of Asbestoline its use is of necessity perfectly clean and free from waste.

(Signed) OTTO HEHNER, Public Analyst.

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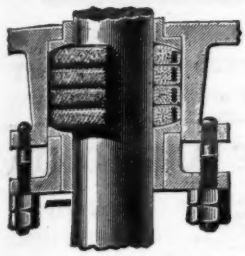
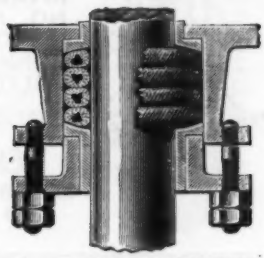
BELL'S ASBESTOS DAGGER PACKING

PATENT No. 15,496.



ROUND.

SQUARE.



Every 10 feet has Label as above, and bears our Trade Mark.

Under this registered title are included the inventions of Mr. Field; and experience has proved them to be the MOST EFFICIENT, DURABLE, and ECONOMICAL PACKINGS ever made. They constitute such a combination of Asbestos and India-rubber as secures the maximum of elasticity and heat resistance; and they are, therefore, UNEQUALLED FOR EVERY KIND OF ENGINE. These Packings are being universally used by most of the leading Steamship Companies throughout the world for ordinary Compound, Triple, and Quadruple Expansion Engines of the latest type. The Packings are composed of rolled Asbestos Cloth, but the India-rubber is placed in two forms to suit various cases.

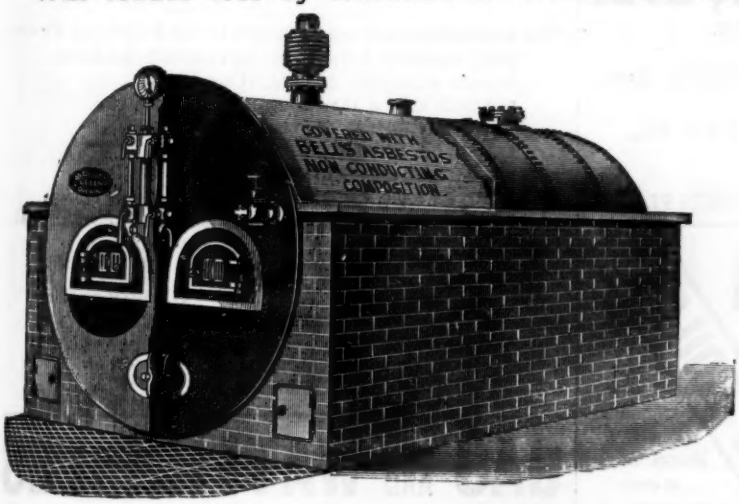
IN ORDERING STATE WHETHER SQUARE OR ROUND IS REQUIRED.

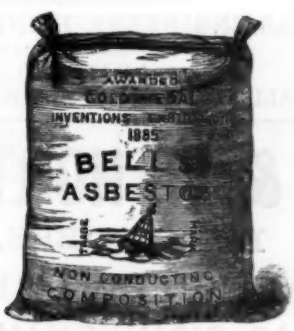
Price of either Section, 5s. 6d. per lb. Steam Vulcanized, 6s. 6d. per lb.

BELL'S ASBESTOS NON-CONDUCTING COMPOSITION,

FOR COVERING BOILERS AND STEAM-PIPES,

Will reduce loss by radiation to a minimum and save 40 per cent. of fuel.





Price 25s. per Cwt.

Second Quality, 15s. per Cwt., is superior to the best sold by other Firms.

It is essential in covering that it shall not only be a non-conductor, but a substance free from whatever can injure metal, and of a nature which will enable it to adhere well for years. To do this it must be sufficiently elastic to prevent cracking and leaving, by expansion and contraction, the heated surfaces to which it is applied. This Composition is daily applied to Tanks with Round or Flat Bottoms, and its adhesive properties enable it to keep to the surfaces without bands or any device necessary for holding on other compositions. Our covering never fails to Save its Cost in a few months, lasts for years, after which it can be taken off and applied again with a little fresh. In all respects it is so superior as to be infinitely cheaper than Compositions sold at one-fourth the price. We would point out that this, being supplied dry in bag, will cover six times more surface than other materials which are sent out wet in cask. This shows the apparent low prices of other Compositions to be a sham.

For Export about one-third cost of freight is saved as compared with Compositions sent out in a wet state. In competition its never-failing efficiency has repeatedly proved it to be the cheapest material in the market for prevention of loss by radiation.

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MOST INTENSE WHITE BRILLIANT GAS LIGHT.
MOST ECONOMICAL, SIMPLE, AND DURABLE.
DOES NOT GET OUT OF ORDER.
RIVALS THE ELECTRIC LIGHT.
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2. They can be made in one piece up to 10 feet long.
3. Uniformity in thickness, ensuring equal Expansion and Contraction.

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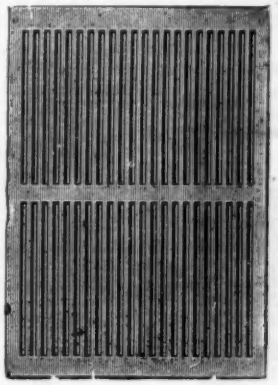

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Weight of illuminating matter in pounds of sperm, 820·80. Very free from impurities.

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ADVANTAGES ATTENDING ITS USE ARE:—

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REDUCTION in LABOUR and COST of WORKING.—In Works where this System of charging and drawing Retorts is adopted, there has been effected a substantial saving in the cost of Gas Manufacture in the Retort-House; the amount saved varying in different Gas-Works from **8 PENCE** to **15 PENCE** per Ton of coal carbonized. Full particulars will be forwarded upon application to W. G. I. Company, Limited.

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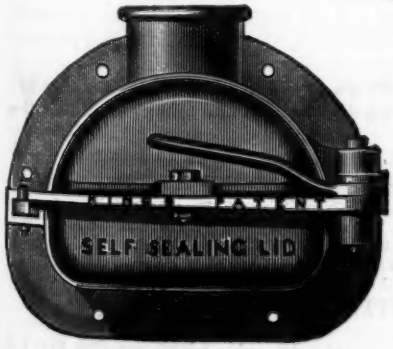
POWER CHARGING AND DRAWING MACHINES, driven by **Wire Rope, Steam, or Compressed Air.**—The power machines are applicable to circular, oval, or ⌂-shaped retorts and mouthpieces, and are the most perfect, economical, efficient, and durable machines made; they are constructed on principles founded by long and extensive experience in this special branch of gas engineering and the manufacture of gas.



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